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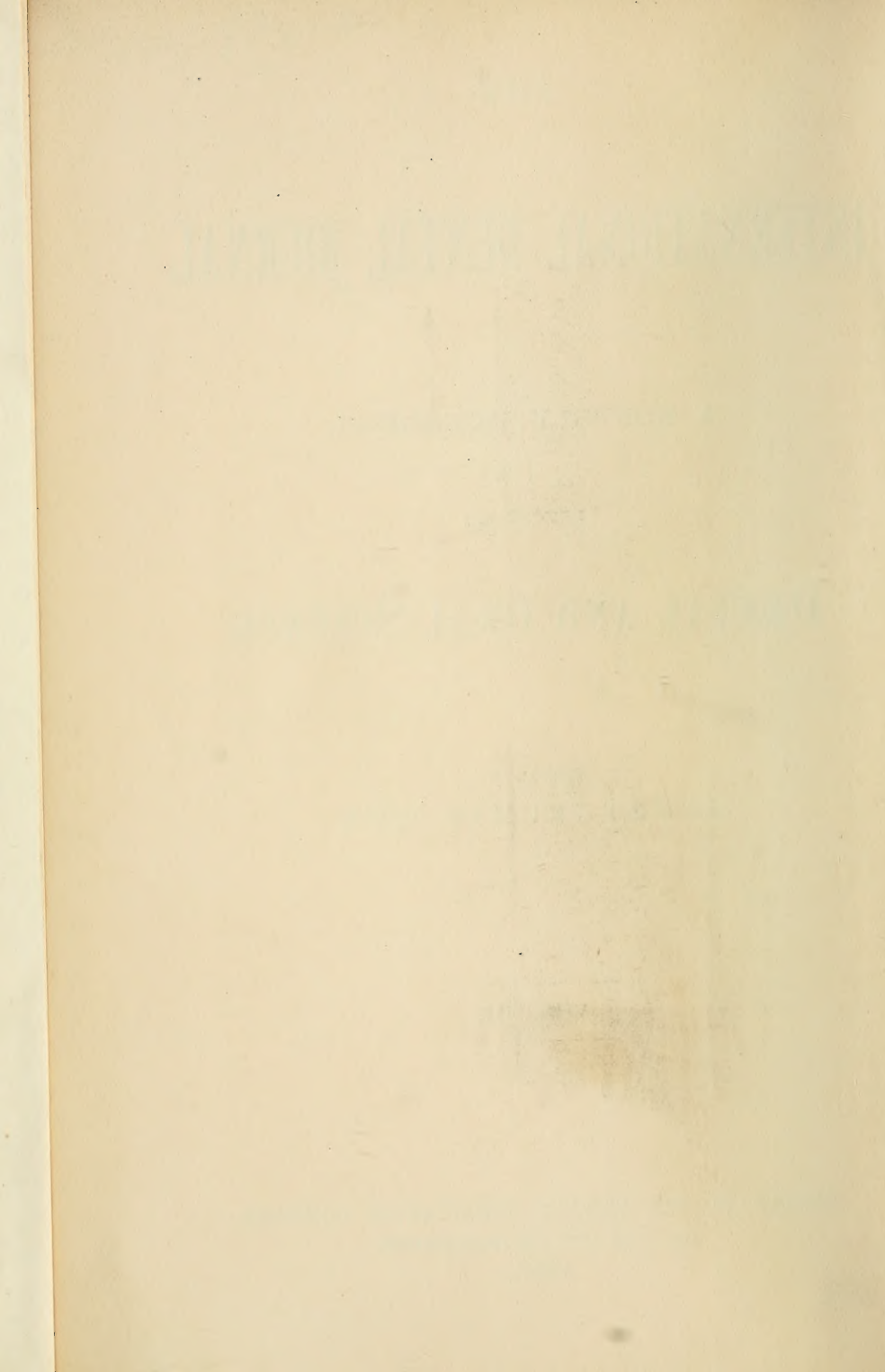
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Original Communications.¹

THE INFLUENCE OF ADENOID HYPERTROPHY AT THE VAULT OF THE PHARYNX UPON THE DE- VELOPMENT OF THE HARD PALATE.²

BY DR. D. BRYSON DELAVAN, NEW YORK.

IN no department of the invaluable art here represented have greater advances been made of late than in that which has for its object the correction of deformities resulting from faulty positions of the permanent teeth. The intelligent study of unusual conditions, the adaptation of mechanical appliances of extraordinary ingenuity, and, above all, the accurate appreciation of the possibilities present in a given case, all of these factors have contributed to produce results which, but a few years ago, would have been considered impracticable. Surely to the relief of the malformations to be discussed in this paper dental surgery has amply contributed its share. In the face of what may be considered a veritable triumph, however, we are confronted with the fact that, in a large number of the worst cases which apply for treatment, there are present in the upper jaw certain deformities of the bony arch itself, which, despite the utmost success in the restoration of the teeth to

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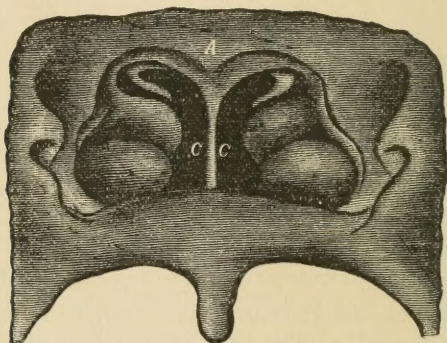
² Read before the New York Odontological Society, November 16, 1890.

their normal line, fail to disappear in the presence of the otherwise improved conditions, and persist throughout the remainder of the patient's life.

It is my purpose to explain somewhat minutely the exact nature of these deformities, and to call your attention to a condition which, I believe, is their most common and efficient cause,—namely, to the disease known under the name of “adenoid hypertrophy at the vault of the pharynx.”

High above the soft palate, and posterior to the nasal cavities, is that part of the pharynx which forms its roof or vault. (*Vide* Figs. 1 and 2.) Normally, this should be a free, empty space,

FIG. 1.

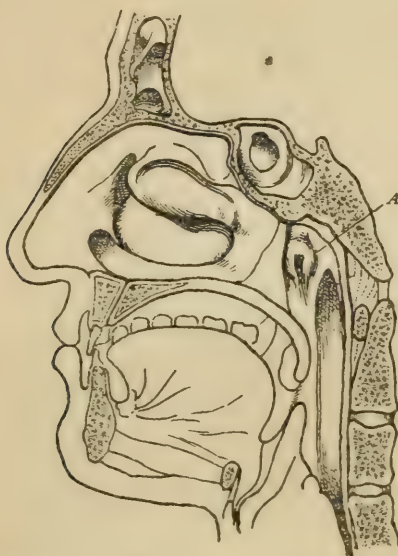


The upper pharynx in the healthy condition; the vault or arched roof, *A*, being well rounded and free from obstructing tissue, and the entrances to the nose, *C*, being entirely clear and open. (*Lefferts.*)

arched from before backward, and from side to side. This region is covered with mucous membrane and it contains a small amount of adenoid tissue, the same structure as that of which the faucial tonsils are mainly composed. Like the faucial tonsils, this pharyngeal tonsil, as it is sometimes called, is susceptible of chronic enlargement, or hypertrophy, and in this condition of chronic enlargement it constitutes the disease which forms the subject of our discussion. It is not necessary that an elaborate description of this adenoid hypertrophy at the vault of the pharynx be given here, as that has been done many years ago by the distinguished Professor Wilhelm Meyer, of Copenhagen, in his classic paper on the subject. It must be understood, however, that adenoid hypertrophy involves a filling up of that part of the respiratory channel

which lies behind the nasal cavities, on the one hand, and above the soft palate, on the other, by a tissue closely resembling, if not

FIG. 2.



Side view of the pharynx, representing the same normal condition as Fig. 1. In natural respiration the mouth is closed and the current of air enters through the nose, where it is first filtered, warmed, and furnished with moisture, and then passed directly downward through the larynx and trachea into the lungs.

identical with, that which composes the tonsils. (*Vide* Figs. 3 and 4.) Not only is the cavity of the upper pharynx or post-

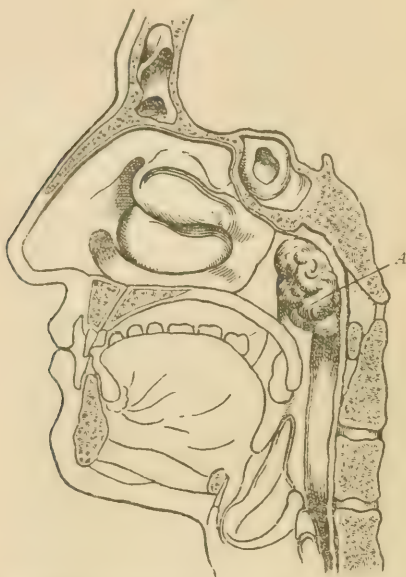
FIG. 3.



The upper pharynx, showing a large adenoid growth, A, springing from the vault, filling the superior part of the pharynx, covering the tube leading to the ear, C, and obstructing the entrances to the nose, B. (*Lefferts.*)

nasal space more or less filled by the actual mechanical presence of the growth itself, but it is also obstructed by the excretion of large

FIG. 4.

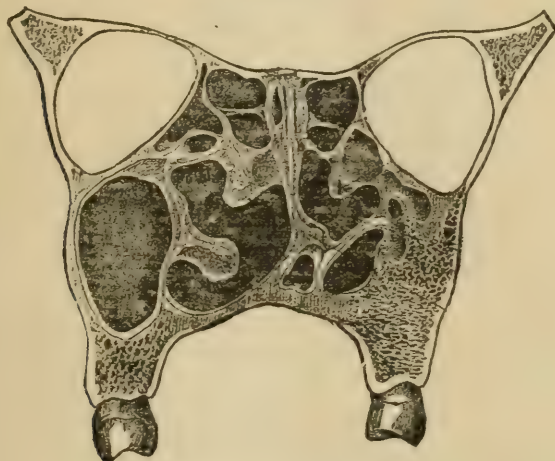


Side view of Fig. 3, showing obstruction, A, in upper part of pharynx. Owing to this the patient must breathe through the mouth.

quantities of viscid mucus, which still further tend to occlude the passage and to interfere with nasal respiration. Thus it is made more or less difficult, or even impossible, for the patient to respire through the nose, and he becomes, as it is commonly called, a "mouth-breather." Now, the habit of mouth-breathing is most pernicious. This proposition will be evident when we call to mind the exceedingly important rôle played by the nose in the process of respiration, its physiological action being to free the inspired air from dust, to raise its temperature, and to furnish it with a large amount of moisture. Moreover, in the mouth-breather, it is not alone the quality of the air which is unnatural, but, what is even of greater importance, the actual amount received into the lungs is diminished, so that the child fails to secure the necessary supply of oxygen. It is of the utmost importance to the whole physical economy that the respiratory function of the nose be normally performed. The point which is of chief interest to us is that there are no parts of

the body which suffer greater ills from mouth-breathing than do the nose itself and the bony structures in immediate relation with it. This statement has been amply proved by experiments upon animals (Ziem), for it has been found that if one nostril of a young rabbit be permanently occluded, the creature allowed to attain its full growth, and then killed and dissected, not only will the nasal cavity of the affected side be under-developed and deformed, but the whole of that side of the face will be asymmetrical

FIG. 5.



Asymmetry of nasal cavities.

and distorted. This, we believe, is equally true in the human being, for it is a matter of common observation to find deformities corresponding to the above in individuals who have suffered occlusion of one nasal cavity, such as may arise from a partial filling of the upper pharynx or from hypertrophy of the nasal mucous membrane. If it be true that occlusion of one nasal cavity will result in unilateral deformity of the neighboring parts, it is likewise possible that entire stoppage of nasal respiration through the occlusion of both nostrils will affect seriously the development of both sides of the face, and that we shall find, in consequence, deformities of its skeleton, which may exert an important influence upon parts with which the nose is not immediately connected.

Clinically, such cases are constantly seen; and in children who have been mouth-breathers from an early age, we find that, associated with deformities of the nose, there exist changes in the sinuses

adjacent to the nose, by reason of which the whole shape of the face may be altered. What is of greater interest to us, alterations in the shape of the hard palate occur, both in its horizontal and its transverse diameters. By reason of these it is greatly narrowed, its roof is thrown upward, and the whole contour of the dental arch is transformed. To describe these changes more minutely, the results of adenoid hypertrophy upon the hard palate are most prominently displayed in the faulty position of the upper incisors, so commonly noticed. In addition to this, there are several other attendant conditions of the superior maxilla which are worthy of study. In examining one of these cases, we shall find, as a rule, that the roof of the mouth is exceedingly narrowed, and that it recedes from below upward until, sometimes, its highest point can hardly be touched by the tip of the patient's tongue. In other words, instead of the transverse diameter of the roof of the mouth being in the shape of a well-rounded, semicircular arch, it has become pointed, or shaped like an inverted letter A. Normally the contour of the part was that of the Norman arch. In its changed condition it has become Gothic. This peculiarity is so distinct and evident that it can hardly escape notice, and once seen will not be forgotten. Accompanying this deformity of the hard palate, there is generally a corresponding alteration in the shape of the upper dental arch, the transverse diameter of which is more or less diminished. This is particularly the case anteriorly, and is usually most pronounced in that part of the arch which lies forward of the canines. The result of this is to change the shape of the dental arch in a way analogous to that described above as characteristic of the hard palate,—namely, from the rounded to the V-shaped contour,—so that the normal curvature of the arch is entirely altered. Chatellier suggests that this condition, constituting the so-called "prognatism," should be considered less a race-peculiarity than a true pathological state. The prominence of the anterior region of the alveolar arch is still further increased by the projection forward of the superior maxilla at this point, and of the upper front teeth. These latter often project so considerably as to push forward the upper lip, under which they appear from below. The more the dental arch has become narrowed, the more prominent is this part of the superior maxillary bone likely to be.

In examining one of these cases, it will be found that the walls of the nasal cavities and the roof of the mouth have not kept pace with the general development of the head, but that they are, in many instances, smaller. On the other hand, the alveoli of the

superior maxilla, being subjected to the physiological stimulation of functional activity, rapidly develop up to full maturity. The expression of the stunting of growth of the vomer, the septum of the

FIG. 6.



Deformity of nasal cavities associated with marked narrowing of arch of hard palate.

nose and the sinuses, is seen along the line of union of the septum with the hard palate, which is more or less fixed centrally, while the alveoli continue to grow and increase downward (Spicer).

It is certainly suggestive to remember that among primitive races, such as the Indian and the negro, in whom mouth-breathing is almost unknown, these deformities of the superior maxilla are very unusual. Several theories have been advanced to explain the mechanism of this change. It is probable, however, that no one cause is exclusively concerned in it, but that it is due to several factors which, combined, finally succeed in the production of the characteristic result. Among the explanations offered, that of David is one of the best. He believes that the deformity of the hard palate is caused by atmospheric pressure, the act of swallowing causing in persons suffering from nasal obstruction a partial vacuum in the upper pharynx and nasal cavities, as proved by the sunken condition of the tympanum of the ear, common in these cases. Rarefaction of the air above the hard palate with a continuation of the normal pressure below it tends to the constant pushing upward of

the roof of the mouth. The younger the child, the more, presumably, will this influence be felt and the greater will be its effect. Again, according to some, the mouth-breathing habit compels the constant dropping of the lower jaw, which, hanging by the cheek from the superior maxilla, causes constant pressure upon the upper jaw. This produces flattening of the lateral alveolar arches and shortening of them, in consequence of which there is not sufficient space for the eruption of the canines when they are due, and they, therefore, grow forward.

According to Bazin, the deformity is still further exaggerated by the presence of the tongue in the floor of the mouth, which by its weight would tend to cause the lower jaw to expand beyond its normal limits, and thus still further impair the already imperfect coaptation of the lower teeth with those of the upper arch, while the absence of the tongue from the roof of the mouth would probably tend to increase the deformity of the hard palate itself.

Impaired development by reason of nasal obstruction of a part of the arch; the effect upon the arch of atmospheric pressure; the result of traction upon the outer walls of the maxillary region; and, finally, the influence of the tongue,—all these factors may contribute more or less to produce the deformity of the arch in question. It is my belief that of the causes above mentioned, atmospheric pressure and faulty development of the nasal region are probably the most important. With our present knowledge, it is impossible to determine with certainty which of them plays the most prominent part. Certain it is, however, that mouth-breathing itself, the efficient factor in the production of these secondary causes, is almost invariably attended with the deformities above described, as proved by innumerable cases, constantly seen by competent observers the world over. While, as before stated, brilliant results can be obtained in the correction of the faulty position of the teeth, the deformity of the hard palate is unfortunately irremediable. We have at present no method by which, when once established, it can be overcome. It is not necessary that the child should have attained considerable development in order that the deformity of the hard palate should be well established. On the contrary, it may exist at a very early age. I have seen it perfectly exhibited at fourteen months, while there is probably no reason why it should not occur even in younger children. It is highly important, therefore, that it should be, so far as possible, prevented from establishing itself, and this may best be done by the early recognition of the fact that the patient is a mouth-breather, and that some obstruction of the nose

or pharynx is present. Such obstruction, when recognized, can always be removed, and, whether occasioned by adenoid hypertrophy, nasal obstruction from hypertrophic catarrh, or from enlarged faucial tonsils, should never be allowed to remain unrelieved. The operation for the removal of the offending tissue must vary somewhat with the nature, extent, and situation of the growth. As a rule, it is best performed under an anæsthetic, and to be thoroughly successful must be done with considerable care and skill.

The result of the removal of adenoids from the pharynx is most happy upon the whole well-being of the patient. In children the effect upon the development of the nose is sometimes very striking, and although the high arched condition never entirely disappears, the earlier the mouth-breathing habit is cured the better will be the opportunity for the palate to be relieved of the influences which are working against it, and for the deformity to decrease with the improved general development of the part. At present, removal of nasal and pharyngeal obstruction is the best and only preventive measure we have at hand.

May we not hope that the future may bring to us some efficient method by which these deformities, when once established, may also be overcome?

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CONCERNING THIRD MOLARS.¹

BY DR. C. A. BRACKETT, NEWPORT, R. I.

WHEN our good Executive Committee honored me with an invitation to read a paper before you, I was moved by a number of considerations to take the subject which has been announced. I have little to say in theory, but there are connected with the third molar practical points whose careful consideration may be profitable for us, and through us of great advantage to those who come to us seeking relief from some form of suffering which a third molar may occasion.

The third molar is a tooth against which, justly or unjustly, much is said. There is a popular prejudice against it as "a black sheep in the flock, even shorn, which comes up from the washing." Patients say, "If that is a wisdom tooth, I don't want to have anything done to try to save it, because it is sure not to last. Wisdom teeth are decayed before they are half through the gum; they are forever coming, and all the while are a source of torment. From beginning to end there is nothing good about them, and I don't see why we have wisdom teeth anyway."

It must be confessed that there are numerous instances in which such statements are not a distortion of the truth. The teeth are valueless, and worse than valueless, and often patients do suffer from them seriously and extremely; but to condemn the third molar *in toto* and indiscriminately is not warranted. There is another aspect of the subject, and in fairness it should be presented.

With a view of determining the relative frequency of decay with the different teeth, Dr. Magitot has prepared a table, from the results of his examinations of permanent teeth for caries, showing that, of ten thousand instances, but three hundred and sixty were of the third molar. By Magitot's table the order of frequency of caries of the different teeth is as follows: Lower first molar, upper first molar, lower second molar, upper first bicuspid, upper second bicuspid, upper lateral incisor, upper second molar, upper central incisor, lower second bicuspid, upper canine, lower first bicuspid, upper third molar, lower third molar, lower canine, the two lower incisors.

This showing is remarkably good, and the position in the scale

¹ Read at the meeting of the Academy of Dental Science, Boston, March 8.

of the third molar next to the lower canine is a place of great honor. Were the ten thousand instances of caries equally divided among the different classes of the thirty-two teeth, the four third molars would be entitled to an eighth of ten thousand, or twelve hundred and fifty, instead of the three hundred and sixty which were found. We do not know the ages of Magitot's patients. Presumably the cases were consecutive ones for examination in practice, and doubtless included a fair proportion of patients not of an age to have third molars; but allowing this to be the case, a moment's thought will show us that such is real life, and if we are seeking to get at the proportion of cariously infected third molars to cariously infected other teeth, I do not see that there is reason for believing that there is great fallacy in Magitot's figures.

The late Professor T. B. Hitchcock prepared a table of twenty thousand cases of fillings and of extractions for all reasons, chiefly, of course, for caries, the cases of filling and of extraction being all grouped together. Of these twenty thousand cases, nineteen hundred and twenty-four were third molars. A full eighth would be twenty-five hundred, or nearly thirty-three per cent. more than the actual; but of the twenty thousand, the number of first molars was forty-four hundred and ninety-nine. Without going into too much particularity, the order of frequency of affection by Dr. Hitchcock's table is,—upper and lower teeth being grouped together,—the first molar, the second molar, the second bicuspid, the central incisor, the first bicuspid, the lateral incisor, the third molar, the canine. Classing the upper and lower incisors together modifies the place of each in the scale, but does not affect the relative position of the third molar, which has here again honorable showing, so that after making all allowances for circumstances influencing the figures in the table, the deduction seems fair that the third molar is not among teeth the one most prone to caries.

There are reasons why we might look to find it a better tooth than the others, prominent among these reasons being, of course, the circumstance of its development at a time in the age of the individual when the constructional powers are at their best. Given a good heredity, with no mischief-making mixing of family types, with no disproportion between the size of the teeth and the size of the jaws, with proper diet and proper regimen in all particulars throughout the period of development, it is reasonable to expect to find—and practically we do find in cases of this kind—an approach to perfection of organization and arrangement in which the third molar is no exception to the general rule; and there are, as we all

know, instances in which the later rather than the earlier circumstances of growth were most favorable, in which the third molar is the best tooth in the mouth. It is also often an excellent tooth in mouths from which other molars have been early lost, so that it has ample room for development. A beautiful specimen of good formation may be found, in a large proportion of cases, by cutting down upon and extracting a third molar before it has erupted at all, and before it has become a pathological centre through impaction, malposition, or difficulty or delay of eruption. Not all third molars are perfect in formation, but a practical study of the subject will show that a much larger proportion of them are formed perfectly than remain perfect. Many of them are more sinned against than sinning. They are the victims of unfavorable circumstances, of bad environment, of unhygienic conditions, of poor ventilation, imperfect drainage, lacking cleanliness, microbe pollution, malaria,—all of these in the immediate, local sense intrinsic in the investments of the particular teeth, or more generally in the system of the possessor of the teeth or in his surroundings in turn, disproportion between the size of the tooth and the place which is provided for it to occupy in the world, slow eruption, overlying gums, surrounding inflammation, and its regular, overhanging cheek, comparative inaccessibility, so that it cannot be reached well by the ordinary means of grace and salvation for teeth,—these and similar elements of the situation should come in for that just estimation which will relieve the tooth itself of much of the odium generally bestowed upon it.

The question whether there is in the frequently-obtaining characteristics of the third molar an illustration and proof of the doctrines of Darwin is an interesting one. I myself believe that we are seeing in the cases of difficult, poor, and dwarfed development of the third molar, and in the not very rare instances of its entire non-appearance among people living under the more artificial conditions, evidences of nature's economy, of the adaptation of means to ends, of the non-development of that which is not demanded. The good development of the third molar in races requiring of their entire masticatory apparatus the most vigorous service is well known.

There is a legend that there have been found fossil remains of an old race of giant men with four well-developed molars in each half of each jaw, but my inquiries thus far have failed to substantiate it. Dr. W. C. Barrett has told me that he has found nothing of the kind. Professor F. W. Putnam, curator of Peabody Museum of American Archæology and Ethnology, has kindly written me

this: "In answer to your letter about skulls containing the fourth molar, I can only say that I do not remember ever to have seen such a skull, nor can I recall any mention of one. Dr. Boas, who has examined a great many skulls, is working at our Museum to-day, and he informs me that he has never seen the fourth molar. On the contrary, we both agree that the absence of the third molar is quite a common event."

The not infrequent failure of development of the third molars is a fact to be considered in connection with any suggested situation of the first molars. Doubtless we have all of us seen a number of instances in which, through the sacrifice of the first molars and the non-development of any third molars, the patients have to go through life with but one molar in each quarter of the mouth. Especially is this undesirable state to be guarded against if either parental branch of the child has failed to develop third molars. Such dental peculiarities are very likely to be transmitted from generation to generation.

An old theory which held that carious third molars present in the mouth were a protection to the other teeth through the exhaustion upon themselves of the disintegrating forces appears in the light of modern etiological science rather ridiculous.

The *vis a tergo* of the erupting or erupted third molar may be helpful or harmful to the position of the other teeth according to circumstances. It may serve as a strong buttress to maintain firmly apposed the bulbous proximal surfaces of the other teeth all around the arch; its eruption may close up otherwise existing open spaces; its crowding already overlapping, irregular teeth may markedly increase the deformity of an arch without a key-stone in place; its retarded difficult eruption or efforts at eruption in insufficient space, perhaps itself malposed, is not rarely a source of extreme discomfort, pain, and disability long continued, or recurrent perhaps for years. Irritation, inflammation, and suppuration of its immediate investments are but a portion of the mischief it entails. Happily for escape from lasting disfigurement, abscess about the third molars, whether from crowding or from dead pulp, has less tendency to point externally than have such affections with other lower teeth. Troubles with the throat, with the ear, and other organs of special sense, and many neuralgias in regions that might be supposed to be out of the range of such influence arise in many instances from these third molars.

A practical point in diagnosis to be remembered is that pain often seems to be located more in the peripheral distribution of a

given nerve-supply than it really is, farther forward in the mouth, or, through reflex action in situations more or less remote from the actual location of the irritation.

As in all other matters in dentistry, good judgment is needed to determine in a given case whether it is best to conserve or sacrifice a third molar. The probable influence or effect of each procedure is to be studied. The quality of the tooth-structure, tendencies to decay, the relations of the surrounding tissues, the standing of other teeth in the mouth, are all to be regarded. In every procedure involving conservation, sacrifice, or replacement, the antagonism should have careful attention. Without this thoughtfulness there must be in many instances failure to render the best service.

The points which I would especially emphasize are, first, that upon the inception of trouble with a developing third molar, a decision should be made as to whether the tooth is to be retained or not; and second, if the tooth and its situation are such that its room is better than its presence, it should be removed at a very early stage in its history. Disregard of these sound principles and the evasion of the radical operation, where needed, permits patients to suffer much and unnecessarily, and in some few instances subjects them to extreme risk. Cases are on record of even fatal results from pathological developments, having as a nidus an impacted third molar.

If the tooth is to be kept, the application of the principles of depletion, of derivation, of perhaps counter-irritation and cauterization, or gum-section, with or without local or general anæsthesia, is well understood. It cannot be said that the entire list of remedial possibilities is often so speedily and completely successful as we could wish; but in the cases in which their employment is indicated, patience and persistence should ultimately attain the desired end. If the second molar is a bad tooth, while there is a prospect of the third molar becoming a good tooth, in good position, if given an opportunity, the second molar should, of course, be sacrificed; but I can hardly conceive a case justifying the loss of a good second molar to relieve the trouble incident to the crowded eruption.

An upper third molar in any position is not often difficult to remove. A lower third molar, if standing nearly erect in the socket, can in the ordinary case of that kind be gotten away with the forceps, even while yet entirely covered with the gum. The difficult cases are mostly of malposed lower teeth, and these are most frequently inclined forward so that the coronal surface presents more or less directly against the distal surface of the second molar. I

have seen a jaw in which a lower third molar was occupying a position directly transverse and horizontal; but any such marked deviation of position is extremely rare.

When once the decision is made that the comfort and well-being of the patient would be favored by the absence of one of these bad third molars, it should be removed with such heroism of operation as the case requires. If the ordinary instruments and procedures for extracting teeth cannot be brought to bear, or will not answer, it should be made such a surgical operation with such appliances as will suffice. The extent and difficulty of these operations are not out of proportion to the seriousness of the troubles to be relieved; and dentists are the ones to operate. The instruments and the details of the operation are to be determined by the peculiarities of each case. Ordinarily, the more difficult of these operations are not to be undertaken without that deliberation and control which are commanded by full etherization. Notwithstanding the patient's inability to open the jaws more than a small fraction of an inch, full opening of the mouth is rarely difficult to accomplish under ether with lever- or screw-power, and a firmly fixed prop seems to retain the opening.

For a third molar, tipped forward and impinging firmly against the distal surface of the second molar, a most helpful next step is the freeing all of that contact by grinding from the third molar with a corundum disk with the engine. This very greatly facilitates the extraction of the third molar, and effectually guards against the deplorable accident—which has occurred—of extracting both second and third molars in the effort to remove the third. The frequent backward curve of the roots of the lower third molar is to be remembered. With the anterior surface free simple lever-power, cautiously applied with a suitably-shaped elevator, may suffice to dislodge the tooth, or to so break up its attachment that the after-removal is easy. Sometimes the process at the sides and overlying the back of the tooth is so thick and strong as to hinder grasping the tooth with a forceps or to prevent its being lifted,—a condition of things particularly embarrassing when the tooth is frail, deeply-decayed, tunnelled, and brittle. In such instances, after suitable dissection of the soft tissues, the bone should be cut away with sharp engine-burs until the difficulty is overcome. Considerable experience has confirmed the conviction that ingenuity and an earnest persistence on the part of the operator, with co-operation on the part of the patient, may surmount the difficulties attendant on the removal of almost any third molar.

However, in these operations well applies the whole of the injunction, "Be bold, be bold, and everywhere be bold; be not too bold." Undue violence, laceration of the soft tissues, and fracture of process, as well as more serious accidents, are all to be guarded against. Any small, loose fragments of process are to be carefully removed, ragged borders are to be ground smooth with corundum stones, and the gum, trimmed with curved scissors if necessary, pressed to overlie in the position most favorable for repair. The patient should understand that one of these operations is very different from an ordinary tooth-extraction, and that the process of recovery, as after any other surgical operation of like extent and involvement of tissue, must take time, and is hardly likely to be free from suffering. Any considerable fracture of process is usually followed by much pain, continuing about a week, and requiring the use of local, sometimes general, anodynes. For the relief of soreness and control of tendency to inflammation, I know of nothing better than very frequent application of the fluid extract of calendula in considerable dilution with water, or fluid extract of hamamelis in full strength. Feter or tendency to sepsis may in some instances require correction by appropriate means.

Besides such accidents as are possible in tooth-extraction generally, there is in the case of the inferior third molar the peculiar possibility of such injury to the inferior dental nerve as may result in temporary paralysis, or even lasting modification of its functioning. I have seen one such case. It occurred in my own practice in 1874. The very difficult extraction, under ether, of the crooked, hook-like roots of the right inferior third molar for a young lady was followed by loss of sensation in that part of the face. Never having then heard of any such experience, I shared in the patient's anxiety; but, reasoning from the undesired restoration of function after a time following designed simple section of the inferior dental nerve for neuralgia, I felt justified in assuring her that I believed sensation would be restored and that she would be able to note its return in about six weeks. After that interval she did begin to have some prickling sensations comparable to those felt when a limb has "gone to sleep," as the popular experience is; and very slowly some slight further improvement took place till it ceased to be much thought of; but now, after sixteen years, there has not been a return of perfectly normal sensibility. There has never been any motor paralysis or deformity of expression.

Quite an interval elapsed after this operation of mine before I could find that any one else had had a like experience. Mr. S. J. A.

Salter, dental surgeon to Guy's Hospital, in his very practical work, "Dental Pathology and Surgery," published in 1875, gives almost all that I have ever been able to find in print in relation to the subject. On page 354, after expressing his surprise that the text-books of the profession did not make mention of such casualties, he proceeds to describe four cases occurring in his own practice, and he makes allusion to four other cases met by Mr. Bell, and one other by Mr. Holden. The outcome in Mr. Holden's case is not stated. In all of Mr. Bell's cases and in three of Mr. Salter's there was within a short time a return of perfect functioning of the nerve; "and this," he says, "must be considered as the ordinary sequence of the accident." Of Mr. Salter's other case he says, "About six weeks afterwards the patient came to me, and at that time there was scarcely any return of sensation. Six months having elapsed I again saw him; he could then feel when the skin of the lips and chin were touched; but it was not a natural sensation, being a feeling of 'formication,' or what is popularly called 'pins and needles.' From that time to the present he has been often under my hands, and I learn that sensation of the parts has never been completely re-established." That was after an interval of ten years, and the manifestations and history correspond with those in the case of my patient.

The paucity of the literature is evidence that experiences of this kind must be extremely rare,—so rare that the possibility of their occurrence should not debar us from using all reasonable means, with caution of course, to remove impacted lower third molars which are the source of suffering.

[The essayist described several cases of extreme suffering relieved by appropriate treatment of offending third molars, and exhibited a collection of such teeth extracted, showing various peculiarities.]

PROFESSIONAL ETHICS.¹

BY DR. S. B. BARTHOLOMEW, SPRINGFIELD, MASS.

PROFESSIONAL ethics is a system of morals formulated out of unwritten laws that by common consent are recognized as best in associated life.

¹ Read at the Union Dental Meeting, Boston, October 28, 1890.

All systems of ethics recognize the fact that character is developed by that which it feeds on, towards the good or the bad, as the food may be, sometimes by slow, yet sure, gradations.

Nature is never abrupt or impulsive in the development of her creations. The process is sufficiently slow for the survival of the fittest and the attainment of the best, and as the great procession moves along, each man is seen and more nearly justly measured than is generally supposed.

Photography is the art of all arts; truthful in its portraiture of that which is pleasing and repulsive, true or false. It is not limited in its surface views, but penetrates deeper and reveals the forces, and how they act. Nature is the great flash photographer and none can escape the Kodak.

There is a mysterious photographic power that hovers about the atmosphere of a man and pictures, in spite of himself, the power that moves within him. He may spurn all moral codes of ethics, all the science of moral philosophy that teaches men their duty and the reasons for it, all systems of rules for regulating the actions and manners of men in society or associated life, yet his ways, his manners, his peculiarities, and habits of life will conform to as cast-iron a law as was ever formulated, and he will practise the unwritten code so systematically that the name and power behind that code can be read or seen of all men as easily as the scientist can with his microscope show you the microbes of a pestilence.

Not every man in associated life has an ethical standard of what he should be; neither does he realize that every right act goes to the formation of a perfect character, as every wrong act mars or enfeebles it. Men who are most prone to go astray are those without an ideal; or if they have one, there is lacking a persistent endeavor to mould themselves to it. Attainment towards an ideal presupposes a law of habit, and that law must have behind it a persistent moral force. If not, it becomes a law unto itself, and so far as reliable character is concerned, principles of moral action do not enter into it. The way is strewn with men who have fallen out of the race in life just because of this moral ethical defect, and when a man says he does not believe in a code of ethics and will not be bound by it, he does not know whereof he speaks, or else he is bound to be a moral wreck, and if you watch long enough for him you will find him on some one of the highways that lead from whatever profession or calling he may have belonged to, a bad man, on the line that will surely take him, if he pursues it, to Canada.

Statute law protects the most necessary and greater rights that

exist among men, but there are other rights that statute law does not reach, that have come down to us through the generations, based on the common rights inherent in social necessities; so that when a man sets up between himself and his neighbor the criminal and statute law and asks himself what does the law allow, he will be a constant trespasser on the moral and ethical rights of his fellow-man.

A code of moral ethics has obtained in associated compacts, and indeed among all classes of people above the criminal. The instinct of this code is so fine and subtle that if a man has any moral sense or conscience prompting him to right actions it will point the way, so that at least his motives will be right though sometimes his actions may be wrong through defective judgment. This code has obtained through the usages of time a supplementary influence over men that is more exacting and controlling than statutes, because it is based on inherent rights, and the man who can, when it suits him, throw overboard this natural and common law, is only a guerilla in the warfare of life, and he is looked upon by his fellows with doubt, mistrust, and often contempt, yes, and is branded as with the mark of Cain, for he has in him all the material that would decide him, if he chose, to cast aside the laws of state or nation, in fact, make himself a rebel against all laws, human or divine.

On us, as a profession, the ethical law of the universe has laid a heavy hand, so that as we work we cannot forget the grandeur and the possible attainments that lie along the path of the true man in his ascent towards the infinite.

A chain is no stronger than its weakest link. A dentist can rise and remain no higher in his professional life than the weakest link in his moral chain can lift and hold him. I am amazed sometimes at the almost total depravity manifested by some of my professional brethren in the way they can go back on their Alma Mater, after she has poured out upon them the wealth of her storehouse, and covered them with the *ægis* of her parchment, proclaiming them professional gentlemen, qualified to do all that may be required of them in the community where they may be located; forgetting all the pledges made to her as sacred as solemn oaths, throwing their code of ethics to the moles and bats; stabbing at every step of the way the profession they have sworn to defend, upbuild, and honor. I have seen the picture of a couple who sat with bowed heads, every line in their faces a furrow of grief that told of hopes blasted through children gone wrong. I said

to myself, they were not worth the grief. Instantly over the picture I seemed to see written, "Blood is thicker than water." Look at it as we may, the disgraceful actions of a child reflect only dishonor, the sting of which is mortification and sorrow. This class of men are open in their defiance of the amenities of professional life. We all know them; some of them for a time will be quite strongly intrenched on the public under the cry of professional persecution; but the public soon learn to know them, and they go to their own among the swine. I do not expect by what I may say in this paper to reclaim these sons of perdition, but perhaps some one who may be impatient and almost discouraged over the slow appreciation of merit by the public may be encouraged to wait awhile, and not throw away his manhood for a mess of pottage.

It isn't a bad idea for a man, however well fixed he may be, to sit down for an hour once in a while and examine himself honestly as to his methods and practices in professional life. If you have never done it, do it; you will be surprised at the estimate you will form of yourself, and still more surprised, later on, how near your own estimate, if it is an honest one, will be confirmed by the public and the profession. It is a man's defects that drop him out of the race, and these defects exist because moral ethics do not sufficiently influence his mental forces. Are these mental forces of ours moving along on a sound and healthy plane, looking towards the things that make for a higher manhood? On what plane does the photograph reveal this mental work of ours? Our thoughts are not always spoken in words, but the composite thought is interpreted and stamped on our faces, is read in our walk, in our manners, in our habits, so that our mentality either attracts or repels. Whatever impression our mentality makes on a patient goes with that patient beyond the door of the office, an impelling or drawing force.

The highly trained moral sense of the brain quickens the sense of sight, smell, and love of æsthetic surroundings. A lady enters your office for the first time, a stranger to you personally; instantly the instincts of cultivated tastes put you on trial, and you stand or fall by that judgment she may form of you from your personal appearance and office surroundings. The judgment of this patient will be the judgment of a very large proportion of those patients that you would like to retain. It is very obvious, then, that our mentality should be clean and healthy, pervading the room, the atmosphere, the patient who for the time being occupies the chair, as the perfumes do the flower garden. Such a mentality, trained and disciplined, is an absolute necessity to the highest and most

successful business career ; it carries with it good judgment and skill and enthusiasm to execute judgment.

Let us look a little further and see if we are quite up to the proper appreciation of a clean standard of morally practical ethics in professional courtesy, those little things done so deftly that the animus may be hidden for a time from the eye and sense of our patients and the public. Whenever the name of a professional brother is a subject of conversation between us and our patient, do we allow professional jealousy to thrust its sting into our remarks? Do we forget the golden rule, "Do unto others as you would that they should do unto you"? Are we in the habit of circulating everything we hear that can possibly injure him? If so, what better are we than filchers of a good name, assassins of character, or petty thieves before a police justice?

"Who steals my purse, steals trash, 'tis something, nothing ;
'Twas mine, 'tis his, and has been slave to thousands ;
But he that filches from me my good name,
Robs me of that which not enriches him,
And makes me poor indeed."

If what I have just spoken of can stand in an indictment, be assured that it will color and give tone to the atmosphere about us and enter as weights against us in the general estimate of our characters by the public, as well as by the profession.

The moral defects in a man's character can be read in his unspoken thoughts, in his methods in operative and mechanical dentistry. Watch yourself only for a day in thought and act, and see how nearly you will break the spirit, if not the letter, of every commandment in the decalogue. Place all the defects you detect in the one day's operations side by side, and the mental reasoning that accompanies each, and then study that day's history in the light of any code of moral ethics. I fear some of us, at least, would see the handwriting that appeared on the wall at Belteshazzar's feast. One illustration in operative dentistry will cover the whole ground and show how near we come to being criminals. There is an expression common to almost every operator, "There! I guess that will do." It means more with some than others. Let us examine the preparation we have made of a cavity for filling, not one especially prepared for examination, but an average one, when we have laid down the excavator, set aside the engine, and said to ourselves, "I guess that will do." How many of us would be willing to have

that examination made by another operator? So in the preparation of the gold and in the filling of the cavity. Do we say, "I guess that will do," when we know it will not do, when we know that the cavity was not properly prepared, and that there are weak spots in the filling that will be fatal to a successful operation? Do we say to ourselves, "That is not right, and it shall be as near right before it is pronounced finished as it is possible for us to make it," or do we give our patient the impression that it is right, and accept the full fee? The merchant who will take advantage of the ignorance of his patrons and sell a piece of cotton-backed for silk velvet is called a liar and a thief by the public, and the law proclaims him a swindler and compels restitution. Our patients are powerless in our hands, hence the necessity of a code of ethics that should be stamped on the moral nature of our profession. The man who examines himself on this line, and acts upon the result of his examination, is the man who grows on the line of the ideal operator, the ideal, conscientious man; his whole life, public as well as professional, becomes tinged by it.

The dentist should be among the foremost men outside of his professional life. With the expiration of his office hours he should be able to turn the key on all professional cares, if his life and business habits are well regulated. What has he to do with his abundant leisure? Give it to recreation and amusement? Its proper share and no more. I say to you, gentlemen, there is no knowledge in the wide fields of science, art, literature, or government that it is not the privilege of the humblest man among us to unlock the secret of each and appropriate their treasures to his own use. A little time well directed each day in active outside pursuits and studies will absorb his restlessness, direct his ambitions, and turn his eyes forward and upward. Work for bread and butter makes of him a simple grad-grind and keeps him on the lower plane, but work as a pleasure, as a duty, as a stepping-stone to higher things, makes of him a full and broad man, sanctifies his ambitions to the benefit of himself and those about him.

The thoughts I have given you in this paper have been culled from a multitude that have been suggested from a close study of the code of ethics under which we, as dentists, are associated. Let me appeal to every young man that has come and is coming into the profession, to make himself familiar with the code that governs the moral action of the men in whose company he has chosen to make the pilgrimage of life, for, be assured, it will give tone and color to the atmosphere about you as you act upon its suggestions or re-

pudiate them. Whichever way you decide to act, a photographic composite picture of your inner self will stand out clear and distinct, so clear and distinct that your professional brethren and the public will form a just estimate of your character and work.

Place then the banner of manhood ethics high in the forefront of your professional and public life, and do not forget that, while you are building to-day, the composite photograph of yourself, your own personal identity, will be stamped on your posterity and tell of your walk and work in life generations after you are gone.

THE RELATION OF DENTAL SOCIETIES TO THE PROFESSION.¹

BY JOS. KING KNIGHT, D.D.S., BOSTON, MASS.

WHEN the chairman of our Executive Committee wrote me at literally the eleventh hour for a paper to be presented before this meeting, my first impulse was to decline for want of time and ability to prepare a suitable subject. But having been on this same committee, and remembering that the eleventh-hour invitations were sent out after all attempts had failed to secure talent of a better grade, and having all manner of sympathy for the committee, in a moment of weakness I yielded, and the Society must take the consequences.

Without attempting a finished paper, I have chosen to present to your attention a subject, with such few thoughts as may suggest themselves to me, in the hope that their introduction may start a line of discussion from which some good may result. I have not selected this theme because of any special fitness or preparation on my part, but because I deem it one which should engage our most serious attention at the present time.

The past decade has witnessed a most radical change in our profession, not only in the methods of operating, but in the plan of carrying on our business; for no one at this time will deny that while our profession is in many respects analogous to that of the medical fraternity, in many other aspects it is susceptible of being classed with the higher arts and sciences.

It is a profession which stands by itself; needs no bolstering up

¹ Read before the Massachusetts Dental Society, December, 1889.

from outside sources; cannot be regulated by the antique methods which govern some bodies which may have some features in common; needs and must have rules and regulations designed especially for it, and for the times in which we live, if it is proposed to keep the bright, active, intelligent, and inventive young men who are growing up in the ranks in harmony with the societies which claim to represent this profession.

My attention was called anew to this train of thought by an editorial in the *INTERNATIONAL DENTAL JOURNAL* for October, 1889, in which the writer says,—

“The past meeting of the Association at Saratoga was not up to former sessions held at that place. The attendance was much smaller and the interest in the proceedings was much less evidenced than at former meetings. Few papers were presented and the discussions were very limited, so much so that the editor of the *Cosmos* pronounced the meeting ‘the least valuable of any held for several years.’ . . . The facts in the case are that the profession is largely written out. As we said editorially in the August number of the *JOURNAL* when opposing the calling of an International Dental Congress, so say we again, ‘Those who are directly connected with the American Dental Association realize the fact that it is growing harder every year to get suitable material to make a good programme; and why? Simply because of the division of interest on account of the many anniversary meetings of large proportions which have been held in America the past few years.’ The American Dental Association is in its decadence, and unless something is done to revive interest in this time-honored institution it will surely pass into oblivion.”

Referring to the same subject, a writer in the *Odontographic Journal* says,—

“There are two prominent disintegrating forces at work, and have been seriously undermining the foundations for a long period. They are, briefly, first, the stringency of constitutional enactments and the combined determination of a few learned in the law to enforce these to the bitter end, and, second, the annual effort to make this convention a political machine, in which the legitimate work of such a body is subordinated to the struggle of rival factions for the control of the presidency.”

And what is true of the American Dental Association I fear may hold equally true of kindred organizations. Celebrating as we do to-day the twenty-fifth anniversary of this our beloved Society, it behooves us to consider the past, observe the present times, and,

with a wise and fearless outlook into the future, so shape our course that the society shall take a new hold upon the members of the profession, and secure their hearty co-operation and support, if we expect it to grow and flourish until the silver shall become the golden year.

Let us look for a moment at what should be the relation sustained by the society to the profession, the faults in our present organization, and the remedies if we can discover them.

The society should be to the profession what the college is to the student; it should be a post-graduate course; a place for mutual conference and observation; a place where one may come to get and to give new ideas; a place for experimentation of those new or radical developments which may at the time be of general importance to the profession; a crucial test which may be applied to all new inventions, that those worthy of adoption may be accepted and the worthless or fraudulent thrown to one side. It should have the condensation and concentration of the experience of individual members, that valuable time may not be lost; and, lastly, it should be able to receive the presence of those eminent in skill and teaching to give by word of mouth that which cannot be so well communicated by the pen. And by these and all means made so interesting and instructive that every member of the profession would find it *more* profitable to be present than absent.

What now are some of the apparent failings in our present methods of conducting societies? I think we will all agree that there are too many different organizations, covering approximately the same field, and holding so many meetings that the interest and attendance is divided, with a consequent loss to all concerned. Take Massachusetts, for example. Out of over a thousand registered dentists, only about one in nine belong to this Society, about one in eighteen to the Connecticut Valley, and the same proportion in the New England, making in all three a little less than one in five who have any membership in these State organizations. And when we consider that many belong to two or all of these societies, we must admit that the proportion is much less, probably not greater than one in seven or eight.

It appears to me that the remedy for this state of affairs is to so systematize the work that there shall be district societies occupying a limited portion of the State, with meetings quarterly or oftener if desired; a State organization meeting once a year, taking one full day and not the parts of two days, *membership to which should be through the district societies*; and a national society, made

up of representatives of the different State organizations, *with jurisdiction over all*, meeting for business and discussion of matters of great importance once in three years. Then the proceedings of these State and national societies should be of such general interest and magnitude as to demand publication in full; thus every member of the profession, from Maine to California, would need to belong to only one society to keep fully abreast with the times, and be in a position to come in personal contact with the best talent of our day. We do not realize the extent and resources of our country in this direction, nor the possibilities of good which would accrue from such a union of effort. We are aware that district societies exist in some sections of the country, but without acknowledging any allegiance to State or national authority. The spirit of the times is towards concentration, and I believe some such plan as this, thoroughly matured as to detail, would result in reducing the heterogeneous, go-as-you-please mass of individual, and oftentimes conflicting, societies into a homogeneous system, with a consequent benefit to the organizations and the profession.

It will be observed that one of the subjects announced for discussion is the formation of an Eastern Dental Association. It strikes me that it would be more to the purpose if the Massachusetts Dental Society would take the initiative, by the appointment of a committee of conference, which shall have for its object the endeavor to unite the many individual societies now in existence into a system or union, which would possess greatly increased power and influence.

Secondly, there is altogether too much waste of time at these gatherings as generally conducted. By attempting to spread them out over two or three days there is an uncertainty as to when any particular subject is to be discussed, and those who have a peculiar interest in that subject, rather than spend hours waiting for it, will absent themselves altogether. If one could attend the district meeting for an evening; could leave his office after the close of a day's work, spend the next day at the State gathering crowded full of valuable points, and be back at the office on the morning of the third; and for the national convention, once in three years, devote the entire week to an interchange of thought and outline work, I believe that all the meetings would gain in attendance and usefulness.

And this could be accomplished by doing away entirely with the reading of papers, having such as are approved by the Executive Committee printed and mailed to each member prior to the meet-

ing, certain hours being assigned for their discussion at the convention, and reducing to a minimum the time used in the discharge of detail business and reports.

Not to weary you, I will say, in the third and last place, that I am impressed that our societies, as to-day organized, are too restrictive in their membership, taking the code of ethics as a test. In our endeavor to guard our ranks against the incompetent and impostor, and with a prejudice born of want of consideration on our part, we keep high the barriers which our forefathers raised, forgetting the fact that our age has outgrown the former standards, and that the competition which is so keen in business life has not left our sacred circle untouched.

Now, do not misunderstand me. There is a large and growing class of charlatans, whose sole object in entering the dental ranks seems to be the ready means of fleecing an unsuspecting public. And in our cities it is especially true that there is a large population who do not know where to turn for reliable dental service; nor are they, in many cases, competent to judge of the quality of the service which they receive. This may be said of many who would rank among the intelligent class. Now the empiric will blaze out in flaming advertisements and inducements of the most attractive kind, and all he wants of the dental societies (aside from stealing what information he can without helping to pay the bills) is that they will keep their code of ethics so strict that the members can in no way, by the use of printers' ink, enlighten the public, or trespass upon what he considers his particular stamping-ground. Thus far the charlatan and the old school dental society are agreed. A reference to Article XII. of our by-laws, for example, shows us that "it is unprofessional to resort to public advertisements, cards, handbills, posters, or signs *calling attention to peculiar styles of work*, lowness of prices, *special modes of operating*; . . . *to publish reports of cases* or certificates in the public prints." And other sections might be quoted if needed.

But are we dealing justly with all the younger members of the profession, who, while fully competent to do good work if they can obtain it, are privileged to sit hour after hour waiting for patients that rarely come, because, forsooth, they have been forbidden to let their light shine and announce to the world wanting such service their ability to perform the same? As Dr. Robinson says, "It is the right and duty of the dentist to inform the public in any legitimate way about his profession, provided he tells the truth and does not promise what he is unable to perform. It is an American

privilege, and is in keeping with the push that is practised in every department of life." An article in the *Cosmos* for August has been brought to my attention since writing the above, and contains many valuable suggestions, but I cannot agree with the writer where he says, "There is a wide difference between a business and a profession. The one is narrow, grasping, self-centred, illiberal; the other broad, magnanimous, and liberal. Business cannot be conducted successfully on professional principles; neither can a profession be creditably conducted upon business principles. I do not wish to cast any reflection upon legitimate business methods. In this age of close competition only the shrewdest can survive; the liberal businessman will surely fail. It is, however, the duty of the dental society to see that its code of ethics rules out business principles as applied to the investigation of matters relating to the general welfare."

I cannot follow him there. I believe that, taken as a rule, the successful business-man will compare favorably in moral stamina and lofty aspirations with the best of the dental profession; and it is to me a cause of regret that we should attempt to assume the "holier-than-thou" attitude, and claim that disinterested philanthropy and unselfish desire to serve the "dear public" is a monopoly of the "liberal professions."

As I have said in the beginning of my remarks, our profession is different from every other and must stand upon its own merits. There is an inseparable union between the operative and the mechanical; between the art of healing and the trade of manufacturing and supplying artificial appliances; between the profession of deep research into the hidden causes of pathological conditions and their removal and the business of selling the best article we can produce to suit the purse and the needs of our patients. And when we as societies recognize this fact, and conform our regulations to the demands of the times and to the protection of all conscientious and consistent workmen, we will have taken a long stride in advance, and opened the door for the admission of just that class which is needed to give new life and energy to these fast-failing bodies. As one has said, "We cannot afford to lose so many of our progressive men as would be forced to leave if we put a strict construction upon the ethics as they are now in force among the medical and dental professions. Professions are made strong by what they *include* rather than by what they *exclude*."

Furthermore, with the idea of keeping our skirts free from any taint of barter or trade, we have declared in spirit, and sometimes in words, that it is unprofessional for one to avail himself of the

protection which the government affords to those who, by the activity of their brains, may work out ideas worthy of protection. I know that this question of patents is a vexed and vexatious one, and no words of condemnation can be too strong for those who obtain the government's aid to enable them to impose upon the profession, either by the patenting of articles which are not original with them, or by the iniquitous system of license or royalty to place the profession under restrictions as to certain methods of procedure. But, on the other hand, where one has faithfully, and by the expenditure of time, brain, and money, produced an invention the general introduction of which will be a benefit to the profession at large, I claim that it is *unprofessional for the societies* to deny to their brother member the just recompense of his skill, and insist that he shall deliver the production of his brain over to the manufacturer, to be either an additional source of revenue to him or be stifled as inimical to some of his other interests.

These, gentlemen, are some of the thoughts, hurriedly jotted down, which have occurred to me, and I am compelled to ask the pardon of the society for presenting them in so crude a form. If anything which has been said shall tend to awaken discussion which shall result in broadening our borders and bringing within the beneficent influences of our societies a larger proportion of those who are working along the same line with us, yet who may not see the way clear to conscientiously uniting themselves in our iron-clad covenant, I shall be content.

A CASE OF NECROSIS OF THE SUPERIOR MAXILLARY BONE.

BY B. D. FRIEDENWALD, D.D.S.

NECROSIS of the superior maxilla is rare. As I have had such a case under my treatment, I think it may be of sufficient interest to warrant its publication.

About three months ago a young woman applied to me for treatment, and I found her suffering from alveolar abscess. After the usual symptoms being manifested, fluctuation was detected. A free incision was made with a scalpel and quite a quantity of pus flowed through the opening, much to the patient's relief.

The superior left central incisor, which was the offending cause, was then extracted, and the patient, who was in an extremely anæmic condition, was put on tonic treatment.

The opening made by the scalpel quickly healed, and the patient seemed entirely well. About four weeks later she again applied to me for treatment, complaining of severe pain about the seat of the former abscess.

A horribly offensive odor was issuing from the mouth, and on making an examination a sinus was discovered. On probing, necrosed bone was found. Fearing that, unless treatment was decided upon, the patient would again suffer with alveolar abscess, I decided to operate.

All the instruments to be used were boiled and placed in a solution of carbolic acid. The patient's face and mouth were washed with a solution of bichloride of mercury. My own hands were disinfected with a similar solution.

The patient was then anæsthetized with chloroform. By means of a circular engine-saw and a surgical engine a free opening was made on the outer side of the right central and the left lateral incisor teeth almost an inch deep. The bone and tissue were then cut away by means of bone-forceps.

The wound was then washed out and disinfected with a solution of bichloride of mercury. A dressing of carbolized lint was then packed into the opening and secured by ligatures to the adjacent teeth. This dressing was changed twice daily for one week, when it was removed entirely.

A mouth-wash, consisting of boracic acid, ten grains to the ounce of water, was given, to be used every hour. In two weeks after the operation the wound had healed, and there was little or no soreness.

An impression of the mouth was then taken and a plate made, with a left superior central incisor attached to it, together with a piece of rubber running up into the space left by the removal of the necrosed bone.

So far the patient has felt no uneasiness, and I have every right to believe that the operation has been a success.

Reports of Society Meetings.

AMERICAN DENTAL ASSOCIATION.—THIRTIETH ANNUAL MEETING, EXCELSIOR SPRINGS, MO., AUGUST 5 TO 8, 1890.

(Continued from vol. xi., page 755.)

[OWING to an error in transcribing, the following remarks of Dr. Allport were accidentally omitted in the December issue, and should have followed Dr. Storey, p. 751.—ED.]

Dr. Allport.—My friend, Dr. Storey, says that a diploma from any dental college should be a passport to practise dentistry anywhere. So it should, and were all our dental colleges satisfactory, it would be. But many of them are not, and we know it.

We know, too, that a large majority of the diplomas that have been issued by this class of colleges are no more an indication of their holders' qualification to practise dentistry than would be so many pieces of brown paper. And it is well known, too, that many of the teachers in these colleges are not qualified to properly practise what they assume to teach. It is necessary, therefore, that we have these State Dental Examining Boards, whose duty it is made to inquire into the quality of teaching done in our respective colleges, and determine as to the significance and value of the diplomas that they issue, as well as to the qualifications of those not graduates who propose to enter upon the practice of dentistry in our respective States.

Were it not for these boards the diplomas of one college would be of the same legal significance as another. Take, for instance, the State of Illinois. In the city of Chicago we have between thirty and forty regularly incorporated dental colleges.

Dr. Baldwin.—Twenty.

Dr. Allport.—We will say twenty then. According to the laws of our State, every one of these colleges has the same legal right to issue diplomas as has the Harvard, the University of Pennsylvania, the Chicago Dental College, or the University Dental College of Chicago, and but for the power given to our State Dental Boards to

determine as to the respectability of these respective colleges, the diplomas of any of them would give their holders the legal right to practise dentistry in the State of Illinois.

Under the general incorporate law of Illinois the requirements to obtain a charter for a dental college, with the right to issue diplomas of qualifications to practise dentistry, are for these men to band themselves together and send their dollars to our secretary of State and ask permission to incorporate and organize a dental college. A permit will be returned, no matter whether the proposed incorporators know anything about dentistry or not.

Our State Board is the only protection that the people have to secure them against graduates of these dishonest concerns, and honest colleges should regard our State Dental Boards as their best friends.

Could we have a unification of the dental laws throughout the different States, as has been suggested, it would no doubt be a good thing, but so long as each State acts independently of the others, I do not see how this can be secured through the State legislatures, nor could it be done by an act of Congress, for the Constitution of the United States gives to each State the right to regulate all such matters as it deems fit. But our National Association of Dental Examining Boards can, by agreement between the various State Boards, make themselves almost as powerful and useful as would an act of Congress or a unification of our State laws upon the subject.

I can see, as Dr. Brown says, that in some cases it would be a seeming hardship for well-known qualified practitioners to be obliged to be examined by a State Board before they could practise in a particular State. But for the good of all such a law is not without merit, for no one should be allowed to practise in any State unless the State Board was satisfied they were qualified to do so. But no sensible board would deem it necessary to enter into a critical examination of Dr. Atkinson or Dr. Storey before allowing them to practise within their State. The law only requires that the State Board shall be satisfied that applicants are qualified to practise, and no need for an examination exists when the applicant is known to be qualified. It is not always the letter but the spirit of the law that should be complied with.

In reference to what Dr. Noble has said about urging our representatives to vote for the bill now pending before Congress, to regulate the practice of dentistry in the District of Columbia, it seems to me it would be a good thing to do, and I would be willing to do what I could in that direction. But it has occurred to me

that a better thing would be for this Association to pass a resolution requesting Congress to pass a bill now pending before it on this subject, and that a resolution of this kind from the American Dental Association could but be treated with respect and consideration.

Second Day's Proceedings.—Evening Session.

The evening session, second day's proceedings, was called to order by President Foster at 8 P.M.

A communication was read from the National Board of Dental Examiners, calling attention to the fact that considerable litigation had been going on in New Hampshire, and that the dental law in that State had been declared unconstitutional by the Supreme Court. It was also stated that the attempts to sustain the law in the lower courts had been feeble, owing to the lack of funds.

A letter of regret was read from Dr. W. H. Dwinelle, of New York.

Dr. Patterson, of Kansas City, Mo., Dr. Atkinson, of New York, and Dr. Goddard, of San Francisco, Cal., were appointed a committee of three to represent the Association upon the National Board of Dental Examiners.

A resolution was passed requesting Congress to pass the law regulating the practice of dentistry in the District of Columbia.

Telegrams of condolence were sent to Dr. W. H. Morgan, of Nashville, Tenn., and Dr. E. T. Darby, of Philadelphia, absent from the convention on account of illness.

A cablegram of congratulations was sent to the International Medical Congress in session at Berlin.

Dr. Truman offered a resolution to the effect that the lantern exhibits be limited to one hour, to be divided between the two lecturers.

The resolution was carried.

Dr. Peirce, chairman of Section 2, then stated that the section had no further report to make. He hoped that some action would be taken by the Association looking to the establishment of a degree higher than that of D.D.S. It would be an additional encouragement to students and young men who are ambitious in the struggle for scientific attainment, and would accomplish much which would be of advantage to the profession.

Dr. Patterson introduced a resolution, asking that delegates coming from local societies be invited and urged to bring with them

interesting and original matters and reports that might be of interest to the members of the Association. The resolution contemplated the selection of one of the delegates of the local society to select the material in order that it might be placed in the best possible manner before the American Dental Association. It was explained that the resolution was a little premature to the plans of the committees, and it was withdrawn by request.

Dr. Smith said that he was interested in the plan of a higher degree than that of D.D.S. He thought that it might be possible to establish an academy of dental science, and that, by due diligence in the choice of the instructors and the graduates, a school of this character might become a great factor in dentistry.

Section 2 was then passed and Section 3 was called. This is the section of Operative Dentistry, E. T. Darby, chairman, N. S. Hoff, secretary. Dr. Crouse, of Chicago, in the absence of Chairman Darby, stated that two reports had been presented to the section. These reports, he said, had been condensed, and would be read by Dr. Baldwin, of Chicago. The report of Dr. Baldwin was as follows:

Two papers were referred to this section by the other sections, and to the writer was referred the task of presenting an epitome of the salient points of each.

The first is upon medicated oxyphosphate fillings, by Dr. Charles B. Atkinson, of New York. In this paper he advises, after an experience of two years in capping exposed pulps, the admixture of various medicaments with the filling-material. The medicaments used are, 1, creosote and oil of cloves; 2, eugenol; 3, deliquesced carbolic acid; 4, oil of cinnamon; 5, oil of cloves; 6, creosote pure; 7, creosote, oil of cloves, and iodoform; 8, creolin; 9, campho-phénique; 10, potassium chlorate powder; 11, salicylic acid; 12, camphor pulvis; 13, stick sulphur pulvis; 14, iodoform; 15, oil of winter-green.

The principle of medicinal action of the mixture is the principle that, upon the crystallization of the oxyphosphate, no further change takes place, hence the remedy may exert some of its remedial action. He employs mostly the first mixture (creosote and oil of cloves). When the medicament is a liquid, he adds about an equal quantity of medicament and phosphoric acid, and when a solid, about equal parts of medicament and oxide. These proportions may be varied as required. He believes that in this way the remedial agent is constantly exerting its effect upon the walls of the cavity, thus resisting germ-action, and also those additions producing increased

hardness and increased resistance to thermal changes. He, from his tests, thinks that the first has been fairly tested, and that they are about equal in durability, manipulation, and time of setting in about ten minutes. He has made no effort to control color. His practice is to freely excavate even to the surface of the pulp and remove almost all of the infected matter in the cavity. He employs this system further in retaining inlays, straightening pyorrhœa cases,—i.e., in setting isolated blocks or single teeth in rubber or gold dentures. The writer always, in capping pulps, covers the exposure with the medicated cement.

The second paper is entitled "A Few Words on Corrective Preservative Obtundent Treatment of the Teeth." It is by Dr. J. L. Williams, of Boston, Mass., in which he says that as early as April, 1856, in the *American Journal of Dental Science*, he gave his treatment of teeth where pulps were endangered but not exposed, the main idea being the saturation and the sealing of the cavity with non-irritant corrective and antiseptic applications, unsealing and repeating when necessary. Mild applications were found to be more effective than stronger. His experience to this time bears out these principles, recognizing that nature only requires mild help in removing diseased conditions, and that the reparative processes are hers.

The writer maintains that the treatment should be a gradual preservative treatment. At the time mentioned (1856) known anti-septics were comparatively few. The writer then used oxide of zinc to stiffen the gutta-percha, which has since then become well known. As a single obtundent he often uses a solution of calcium in checking fermentative action. However, the great object should be not to see how much nature will bear but to know how she works and to assist her. The writer claims in the paper, historically, in relation to the origin of two things, first, the systematized plan favoring the deposit of secondary dentine; second, the first use of oxide of zinc mixed with gutta-percha for a plastic stopping. Hill's stopping was a prior and a patented preparation, having no oxide of zinc and no sulphate of lime to stiffen it.

Dr. N. S. Hoff then presented a brief report of improvements introduced during the year. Two additional materials for filling roots have been suggested,—red cedar, saturated with paraffine, by Dr. James H. Beebe, and beeswax, by Dr. B. F. Arrington. Dr. Taylor, of Hartford, suggests dropping chloroform in the root-canal and then dissolving gutta-percha in it, then forcing a solid cone into the root.

A set of needles, by Dr. W. S. How, for use in making dressings.

For the treatment of sensitive dentine the actual cautery has been recommended by Dr. J. W. Holt.

Dr. R. S. Williams has brought out a new form of crystalloid gold.

Dr. Geo. H. Wiegant has devised a set of diamond trephines for cutting out sections of porcelain.

Dr. E. C. Moore has devised a set of metallic racks for keeping instruments.

Dr. Letord, a double-faced mouth-mirror.

Dr. H. H. Knapp, an apparatus for holding a mouth-mirror and large magnifier in place with rubber dam, etc.

Dr. John L. Gish has invented an improved rheostat for controlling the electric current.

Dr. J. W. Ivory has introduced a pair of molar clamps for the third molar, also a nerve-broach, spiral in form, acting on the principle of the cork-screw.

The S. S. White Dental Manufacturing Company have introduced a number of improvements.

Hood & Reynolds have invented a new dental chair.

Dr. Peirce then addressed the association upon the subject of peroxide of hydrogen. He stated that this material was familiar to all of the members, because of the uses to which it had been applied in the cleansing of pus cavities. It has also been widely used in removing stains from teeth. It occurred to him that the action of the agent on the tooth-structure had never been thoroughly tested. July 7 he placed a bicuspid in a drachm and a half of the liquid. It remained there twenty-four hours. The doctor then discovered that lime had been precipitated in the bottom of the vessel. He again placed the tooth in the liquid, and kept it there until the surface was removed and the dentine was reached. The action on the dentine was much slower than on the cementum. There was no softening of the material of the tooth. Dr. Peirce stated that he had brought the flask containing the liquid with him, but the deposits at the bottom had been disturbed in transit. He thought that the destruction of the organic matter had been proved by the experiment. The tooth had been reduced to two-thirds its size in seventeen days.

Dr. Brophy stated that peroxide of hydrogen is decidedly acid, through the addition of sulphuric acid, and that it should be neutralized before using.

Dr. Rhein said that he had tried this experiment with peroxide

of hydrogen on lime deposits out of the mouth, and he had found a very large precipitation formed in the manner suggested by Dr. Peirce. He had not finished his experiments with the calcareous formation, but he believed that peroxide of hydrogen had a deleterious effect.

Dr. Harlan said that the question of the action of peroxide of hydrogen had received too little attention from the profession, and that this specimen of Dr. Peirce's presents a decidedly acid reaction. When pure it should be neutral. Then there would be no ill effects upon the teeth. He advised the members of the Association to get the acid that is perfectly neutral. He then referred to the use of vulcanized rubber as an inlay. He remarked that last year, while in Europe, he noticed some beautiful specimens at Naples. He thought that it offered to the profession a cheap and serviceable filling.

Dr. Ames thought Professor Peirce must be in error. While in the solution of dentine by chromic acid there is no precipitate because the chromate of calcium formed is soluble, if the solvent be sulphuric acid contained in peroxide of hydrogen, the sulphate of calcium formed would give a precipitate.

Dr. Stubblefield, referring to the experiment made by Dr. Peirce, said that the ordinary peroxide of hydrogen is derived by the action of hydrochloric acid on barium dioxide. If there exist unequal portions of these two ingredients there will remain some of the hydrochloric acid, and the acid reaction observed will be found to be due to this. Sulphuric acid is never added to prevent the hydrogen peroxide from loss of the combined oxygen.

It seemed to him that to dilute hydrochloric acid with pumice would make a better cleanser than peroxide and pumice, because the rapid evolution of oxygen when this peroxide is exposed to the air leaves only H_2O ,—water.

Dr. Peirce inquired, "If the tooth be placed in hydrochloric acid, cannot organic material be found on the surface of the tooth?"

Dr. Stubblefield.—Yes, I would find the basis substance of the tooth.

Dr. Brophy replied that he did not come to the conclusion through examination, but that he had it on the word of a chemist to be relied upon.

Dr. Conrad said that Dr. Fisher had made the statement, at the Chicago meeting, that sulphuric acid is placed in hydrogen peroxide. He said that St. Louis and Chicago manufacturers admitted this.

Dr. Harlan said that some of the chemists admit that sulphuric

acid is placed in hydrogen peroxide. When lecturing to students he told them that they must procure hydrogen peroxide without an acid reaction.

Dr. Atkinson said that he had been in the habit of calling hydrogen peroxide his washerwoman, but he insisted that great care should be taken in using it. He had brought samples of hydrogen peroxide with him, but the express companies had delayed in delivering the packages. He had been disappointed in his own experiments, and he desired to enter a protest against calling careless experiments scientific.

Dr. Ottofy said that he had used iodoform and eucalyptol with good effect, and he had reason to believe that it was a germicide.

Dr. Storey then related his experiments in trying to save pulps. He related several cases that had proved perfect failures in spite of the greatest care exercised. There would be no discoloration, though the tooth would ache and the patient would remain unhappy. He then went on to say that he didn't use any medicines. When he started in to practise medicine he had had saddle-bags and a great coat filled with medicines. He had found oxychloride of zinc excellent for filling the roots of teeth, and when one thing gave him satisfaction he was not disposed to run after anything else unless convinced that it was an improvement. He had found trouble in operating with all of the small instruments introduced to the profession. They were said to be of use in small cavities, but if they were small he was of the opinion that the trouble would be small. He had used peroxide of hydrogen, but it did not meet the conditions. He had then reached the conclusion that he hadn't the ability to use it, and wisely concluded to stick to materials that he did have the sense to use.

Dr. Ames asked Dr. Peirce if he had tested the solution, after it had been used, to see if it had all of the properties of peroxide of hydrogen.

Dr. Peirce replied that he had not.

Dr. Brown advised the members of the American Dental Association not to let any one scare them away from saving of pulps. He said that he had known South Sea Island asbestos to be incorporated with oxyphosphates with excellent results. Asbestos is a non-conductor. There are a thousand kinds of asbestos, but few are good for purposes of this nature. He held that it could be used as a non-conductor under gold filling. He had dreaded very much thermal changes, but his patients had not complained of any additional trouble after the teeth had been filled.

Dr. Swasey said that he would like to mention the matter of an inlay already mentioned by Dr. Harlan. He said that white rubber wears out, not so fast as gutta-percha, but still it wears out rapidly. The inlay that he used now he made from gold, and within the last six months he had been taking impressions from ribbon gold. He placed the gold over the cavity and burnished it as well as possible to the walls. Twenty-carat gold should then be placed in strips in the shell formed and melted there. The inlay should then be tried in the cavity and filled.

Dr. Harlan then gave the tests that had been made with the peroxide of hydrogen furnished by Dr. Peirce. All indicated the presence of an acid.

Dr. Smith remarked that he would like to say something about the preservation of the pulps. He had been taught by histology the proper location of the pulp. From this locality extend the tubuli. These tubuli are filled with an organic substance, and whenever decay occurs there is a destruction of the tubuli. The branches and the foliage of the plant depend upon the harmony of all the parts. Nature is symphonic in its action. It isn't always chemical influences that will destroy pulps. It is suction, the drawing towards the periphery, that kills. Strip a man of his limbs, and he may live, but the harmony is gone forever. You must preserve the harmony. The brain is located in the head, but if you amputate an arm you take away a part of the brain. It is the subtle influence that destroys and kills. My prayer has always been, "Save the pulps." I have made successes in this respect and I have made signal failures. I accord it to the reasons just mentioned, a failure or a success in complying with the conditions.

Dr. Goddard said that he was not here to speak of implantation, but to answer an inquiry that had been made. He held that it is always easy to find a suitable root for any case of implantation by making a groove between the neck of the tooth and the neck of the root. In this manner it is possible to obtain a perfect groove, and it cannot be obtained in any other way.

Dr. Storey thanked Dr. Smith for his explanation. In almost every instance where the pulp had died he had found that something had been put into the tooth to allay pain when filling.

Dr. Crouse said that straws tell in dentistry. His experience did not always agree with others. He had known certain men who never had had any success in capping pulps. He could not tell whether it was a lack of accuracy, carelessness, or something else. But there must be a reason for it. He had participated in discus-

sions before, lost faith in some good old remedy, and had gone back home to try something else, and then he had been driven back to the old remedies. But he still believed that a tooth was better capped than out of the head.

Dr. Storey replied that he lived in Texas, while Dr. Crouse lived in Chicago. He said that there was a funeral in his office three or four times a day. He killed all of the pulps, and he believed that he was doing a good work in ending them. He said that he did not practise dentistry for the purpose of giving himself and his patrons trouble. He added that his opponents had fought him at Dallas and they had fought him all over the State, but he still insisted that he was correct. To save a pulp for two or three years might be a good practice for Dr. Crouse, but it wasn't a good practice for Dr. Storey. He could account for the differences in the results by the differences in the climate if upon no other grounds.

Dr. Crawford was glad that the discussion had taken a practical turn. He said that the members of the profession had failed to take into consideration the different diagnoses made. The extremes were represented by Dr. Crouse and Dr. Storey. He preferred to occupy a medium ground. He held to the principle that when a smaller organ is affected it seldom affects a larger organ. It works the other way, from the larger to the smaller. He always tried to save the pulp. If he failed to relieve the extraordinary sensibility, then he returned to the treatment advocated by Dr. Storey.

Dr. Baldwin stated that in the general practice of surgery it was expected that some allowances should be made for climatic conditions. But allowances were to be made for personal conditions as well. The gentlemen who have been discussing the two sides of the question might not be so far apart as they seemed to think. He had seen teeth where the pulp had been saved, but upon examination he had found the pulp dead. It had died a painless death. It was dormant, if the expression would be allowed for the moment. The explanation might be found in the changed current of nourishment. The increased nourishment renders the parts hypersensitive. Then there is a difference in the characteristics of the patient. It is better to make an attempt to save the teeth of a healthy young person than the teeth of an old or diseased person.

Dr. Rhein wanted it understood that every day that the pulp remains in the tooth so much the better for the tooth in its after development.

Dr. Conrad said that he deemed it eminently proper to attempt

the capping of pulps in young subjects. He believed that climate had a great deal to do with success or failure in certain lines of treatment. He would rarely attempt to cap an exposed pulp in the tooth of an old person.

The following-named dentists were selected to act as a commission to arrange for the dental congress to be held at Chicago, in connection with the World's Fair, in 1893: Dr. J. Y. Crawford, Nashville, Tenn.; Dr. John Storey, Dallas, Tex.; Dr. L. D. Carpenter, Atlanta, Ga.; Dr. Barton, Paris, Tex.; Dr. C. E. Stockton, Newark, N. J.; Dr. Taft, Cincinnati, O.; Dr. L. D. Shepard, Boston, Mass.; Dr. W. W. Walker, New York, N. Y.; Dr. Noble, Washington, D. C.; Dr. A. O. Hunt, Iowa City, Iowa; Dr. Marshall, Chicago, Ills.; Dr. McElhanev, Augusta, Ga.; Dr. M. W. Foster, Baltimore, Md.; Dr. H. J. McKellops, St. Louis, Mo.; and Dr. A. W. Harlan, Chicago, Ills.

The National Association of Dental Examiners at its session today elected the following officers: Dr. C. R. E. Koch, of Chicago, Ills., president; Dr. L. C. Wasson, of Topeka, Kan., vice-president; Dr. J. H. Martindale, of Minneapolis, Minn., secretary and treasurer.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular monthly meeting, Tuesday evening, November 18, 1890, in the New York Academy of Medicine, 17 West Forty-third Street.

The president, Dr. J. Morgan Howe, in the chair.

INCIDENTS OF OFFICE PRACTICE AND CASUAL COMMUNICATIONS.

Dr. Allan.—Mr. President, I have been experimenting for the last month or so upon the vexed question of filling the canals of pulpless teeth with an entirely new preparation and by a new method. Of course, I cannot say at this date whether I am going to obtain any great amount of success or not, but the results promise so well, and the materials that I use seem to be so well adapted to the purpose, that I thought, even at this early stage in my use of them, I would bring it before the society for criticism, or for any remarks that may be made upon it. The points to be aimed at in filling a canal are, first, that the material used shall be negative

in all its reactions; second, that it shall be easily and readily adapted to the walls of the canal. A large number of materials have been used that have had their day and passed away. The number of discussions in the journals, if we will read them, show how large a latitude there is for materials, and how many and various are the ways employed, and we must acknowledge that *the* method of filling root-canals is yet to be found out; and I look upon this method that I have adopted as only a step that I hope will be in advance. It is this: I take nitro-cellulose, which is negative in all its reactions, which is not a material that would be acted on by any of the fluids of the mouth, or any fluid that would be found in the pulp-canals, and I dissolve it in two parts of ether to one of alcohol. It is admissible in all proportions. I dissolve enough nitro-cellulose in the mixture to form a thick paste, and having obtained this mixture and gotten my tooth ready for filling, the rubber dam applied, and the root thoroughly dried out and cleansed, I first wipe it out with a mixture of two parts of ether to one of alcohol. I then take a small pledget of surgical cotton that has been soaked in a solution of one part to a thousand of bichloride of mercury, and dip it in that solution, carefully wiping off any surplus, and this cotton, wrapped around a fine broach, can be passed up into the finest canal. It readily adapts itself to the walls of the canal, and, so far as I know, makes a perfect root-filling. On top of this I place ordinary gutta-percha, which, I think, takes up any little excess of the solution that the nitro-cellulose is dissolved in. I do not see any objections to this method of practice. If there are any, I would like to have them pointed out. It certainly seems to be satisfactory, and places in the root-canal an absolutely negative material, one that germs of any kind cannot act upon, and which adapts itself perfectly to the walls of the canal, and fills all the requirements of such a filling better than anything I have heretofore adopted. I will be glad to hear any criticism that members may have to make upon it.

Dr. Charles W. Miller.—Does Dr. Allan fill the entire canal with nitro-cellulose?

Dr. Allan.—Yes, the entire root-canal and the pulp-chamber. I have taken pieces of antiseptic cotton and adapted them to the walls of a canal in this method, and then withdrawn them and allowed them to dry, and I find that the shrinkage, if any, is comparatively slight, and the resultant is in an hour or so hardened, and apparently has taken the shape and contour of the canal perfectly. Nitro-cellulose is the base from which celluloid is made.

The President.—Gentlemen, we will listen to the report of the committee on the death of Dr. Bronson.

The secretary read the following report :

WHEREAS, The sudden and unexpected death of our late associate and fellow-member, DR. WILLIAM A. BRONSON, has bereft this society of one of its most respected and best esteemed members,—one who labored assiduously for the welfare of the society since the early days of its formation, and who has filled with credit and ability every position of honor that the society could bestow upon him; therefore be it

Resolved, That we desire to express our appreciation of his valuable services to this organization as an earnest co-worker, and of his delightful companionship as a fellow-member.

Resolved, That in his exemplary life we recognized a true and noble character; with a disposition kind, considerate, and devoid of selfishness; conscientious to an exalted degree; just and generous in his dealings with others; modest and gentle in all his ways.

As a professional man he occupied a prominent position in his specialty, possessing sound judgment, combined with excellent manipulative ability, admirably fitting him for his calling.

As a member of this Society he was almost invariably present at its meetings, and in them he always manifested an exceeding interest. To each and every member he was a warm and sincere friend, ready to aid and advance their interests to the best of his ability.

Resolved, That while we mourn and deplore the departure of this sincere friend and beloved member, we reverently thank God that we so long enjoyed his companionship. And in breathing our farewell benediction, these fitting words of peace and promise come to our minds: "Well done good and faithful servant, enter into the joy of thy Lord."

CHAS. E. FRANCIS.

CHARLES MILLER.

S. G. PERRY.

On motion of Dr. Abbott, the report was adopted and ordered to be spread upon the minutes of the Society, a memorial page to be set apart for that purpose.

The President.—Gentlemen, I have now the pleasure of introducing to you Professor D. Bryson Delavan, of the New York Polyclinic, who will read a paper entitled "The Influence of Adenoid Hypertrophy at the Vault of the Pharynx upon the Development of the Hard Palate."

(For Dr. Delavan's paper, see page 1.)

Dr. Delavan.—I have asked several patients to come here this evening in order to exhibit these different things to you, but, with two exceptions, they have not appeared. I have a young gentleman patient here in whose case is shown the very point that I tried

to emphasize in my paper,—namely, that while the work of the dentist may be remarkably perfect in its way, as in this patient, the deformity of the hard palate persists in spite of the good work done by the dentist. In this case (referring to patient present, a boy of seventeen years) the teeth have been very well regulated. I do not think I ever saw a finer result; but you see that the arch is very high still, and that has remained in spite of the improvement in the teeth. If any gentlemen care to look at this case they will see a fine illustration of the main point of the paper. My young friend says he had a cast of his teeth as they were. I understand the deformity was very great. Who was your dentist?

The Patient.—The dentist who regulated my teeth is Dr. S. H. Guilford, of Philadelphia. I could get my thumb in between the teeth of the upper and lower jaws. Now I can get my lower teeth out over the upper ones.

Dr. Delavan.—This young woman (referring to another patient) suffered severe symptoms from nasal obstruction due to adenoid hypertrophy; she had also enlarged tonsils. The high arched roof is here well represented.

Dr. Jarvis.—Are both these cases of adenoid hypertrophy?

Dr. Delavan.—They are.

The President.—Gentlemen, the subject of this very interesting paper by Professor Delavan is before you for discussion. I wish to express, what I know is in the minds of all, that we are under great obligations to him for bringing the subject before us in this graphic and clear manner, and suggesting to us causes of a difficulty, the etiology of which has been to us obscure. No longer ago than last January Dr. E. S. Talbot, of Chicago, read a paper in this city, in which, I believe, he opposed the idea that mouth-breathing could produce any effect upon the shape of the hard palate. The subject was considerably discussed by those present; Professor Peirce, of Philadelphia, alone, I think, of those who discussed it, taking the view that mouth-breathing could alter the form of the hard palate and the upper arch. It seems as though this suggestion and explanation of the causes that may operate to produce a high vaulted arch with narrowness opens up for dentists a new field of thought and investigation. I hope that you will discuss the paper as promptly and concisely as possible. Dr. S. H. Guilford said, at the time of the discussion of Dr. Talbot's paper, that he believed there was "less known of the causes producing the V-shaped maxilla than any other form of irregularity with which we have to deal."

Dr. E. S. Niles.—I feel very thankful to Dr. Delavan for the

presentation of this subject. It was called to my attention some two years ago by a mutual friend of Dr. Delavan and myself in Boston,—Dr. Hooper. At that time two cases came to me for treatment of irregularities, and they were also under treatment for adenoid vegetations. The irregularity of the teeth was quite marked, and while I succeeded in correcting their positions, the deformity of the hard palate remained as it was. I believe this subject is a key to the solution of the question of the cause of a great deal of the deformity and irregularity which we meet with in practice hitherto unexplained. This deposit or growth taking place gradually from very early childhood, at a time when the hard tissues are quite soft and but partially formed, an arrested development naturally occurs on certain lines of normal growth. This would doubtless be produced mechanically in some degree by the attempt of nature to bring the teeth into position. We know that at a very early age not only the deciduous teeth but also the crowns of the permanent teeth are crowded in one over the other, and in turn seek to find their place in regular order. Nature's forces bring them gradually into position at appointed times. The difficulty in breathing owing to the arrested development of the hard tissues forming the walls of the air-chambers, we can see, would retard nature in certain directions, and bring the teeth into an irregular position, deforming the tissues surrounding them. We see, gentlemen, the subject is a new and important one for us to consider. I have some fifteen models, taken during the past few years, of cases which prove all that Dr. Delavan has so well explained to us; and, as I think over the matter, I find there is a new light in which irregularities are to be considered. In all the cases of this kind which appear in my practice I have felt that it was my first duty to refer them to specialists in this line for examination and treatment, if necessary, so that my work may be more permanent and more easily accomplished.

Dr. Ottolengui.—Mr. President, the gentleman who last spoke said that he always refers these cases to specialists for treatment, and the essayist did not tell us what that treatment is. I think we would be grateful to him if he would tell us how these growths are removed, that we may possibly get to be specialists ourselves in this direction.

Dr. W. H. Dwinelle.—I have heretofore stated my conviction that the reflex action and mechanical effects upon the teeth and jaws from adenoid vegetation in children, thereby closing the nasal passages and compelling mouth-breathing exclusively, was a subject

which, as dentists, merits our serious attention. I have also referred to the fact that the naso-pharyngeal cavity obtains but small recognition from the dentists, whereas, it is often the almost exclusive region from which the most serious deformities of the teeth and jaw have their origin.

I have advocated the theory that mouth-breathing was generally caused by adenoid obstructions, and that the continued strain upon the plastic superior maxilla was often, if not generally, responsible for irregularities in that region; the remarkable coincidence occurring between mouth-breathing and the V-shaped jaw would seem to confirm the doctrine. George Catlin, the great Indian painter, in his "Breath of Life," written many years ago, wherein he deprecates mouth-breathing, attributes the narrow V-shaped jaw, the irregular, projected, and uncovered teeth, to this cause, though he did not go back far enough to trace it.

I congratulate myself, too, that the essayist of the evening, and one from a kindred profession, has so fully confirmed all that has been said in favor of the theory of the consequences of mouth-breathing.

He has described in the most lucid manner the proper method of operating. He finds a few instruments only necessary, generally the Lowenbergh forceps and the curette, assisted by sharpened finger-nail as well as the artificial nail, a metallic shield with a rounded edge mounted on a thimble similar to instruments in use with us. Still, for complex operations, the loop, the scissors, the adenotome, the mouth-gag, and retractor find their uses.

I had the pleasure of listening to a distinguished gentleman a few days ago, who says that he oftentimes removes adenoid growths with his finger and finger-nail alone. I have removed them with scarcely better facilities. There is a wonderful coincidence between the V-shaped jaw and adenoid growths. It is shown in this case which I now present to you. This is a cast of a young lady's mouth when she was about twelve years of age, and came to me for treatment. She had a V-shaped arch. It was utterly impossible for her lips to cover her teeth, which projected as you see. Her mouth drooled and was disfigured generally. I removed the adenoid growths without any trouble. She had great difficulty in breathing, could only do so through her mouth, the nasal fossæ being closed entirely, and her voice was thickened and nasal in tone. This second model shows the condition of the arch after the removal of the adenoid growth. The teeth had been regulated, and you will perceive a great change has taken place. There is not

only a change in the expression of the mouth, but the position of the upper lip is much altered, as you will see. From its being a very short and very narrow upper lip, it is now a long and broad one, and so, too, I have changed the whole character of the arch, and given a clear and resonant character to her voice. Although I resorted to the usual methods for correcting the deformity of the jaw, still I think the removal of the adenoid growth had much to do with the success of the operation.

When the removal of adenoid growths are successfully performed, the changes that take place in the condition of the patient are always of the most remarkable character; according to Dr. Hooper, the whole expression of the countenance changes. The mouth generally remains closed as soon as the air-tract is made free, and the lines which have been formed at the angles of the mouth, nose, and the corners of the eyes, by the weight of the hanging lower jaw, disappear rapidly. We notice, too, the remarkable change in the quality of the voice. If these changes are so noticeable when adenoid growths are simply removed, how much more so are they when the teeth are also regulated and brought into their circle, the narrow V-shaped arch expanded to its normal breadth, the antrum, the sounding-board of the voice, is uncovered to exercise its function, and the remodelling of the face at large has carried it back to its original type.

Dr. Jarvie.—Mr. President, I do not propose for a moment to discuss this paper. There are some matters connected with the subject that I do not feel competent to discuss; but I have been a most attentive listener, and have been very much interested in it. Some thoughts arise in my mind in connection with this subject of which it may be in place to speak here. First, the concurrence of the high vault and narrow arch with mouth-breathing. Whether mouth-breathing is the cause of the high vault and narrow arch I am not even yet prepared to say, but that we frequently see the two in the same person is a fact. The essayist tells us that these adenoid growths commence at a very early age, long before the bones of the hard palate have become firmly ossified, and that these growths have an influence in the shaping and thickening of the hard palate. If that is the case, by the time we as dentists see these cases it is too late to change the form of the roof of the mouth. We may change the arch, but we cannot change the roof and the high vaulted condition to any but a very limited extent, because, as the essayist tells us, the bones are thickened very much. It would therefore seem to be the place of the physician to notice

these conditions of mouth-breathing, and treat the case at once, for by the time the cases get into the hands of the dentists it is too late.

While I am not prepared to oppose the theory of the essayist in regard to the mechanical causes of the high vault and narrow arch, such as the dropping of the lower jaw and the tongue lying on the floor of the mouth, I do not see how the tongue in this position can narrow the arch, though it may have an influence in causing the broadening of the lower jaw, which generally accompanies the high vaulted roof.

Dr. Delavan.—That is what I meant.

Dr. Littig.—If the theory in regard to the expansion of the lower jaw is correct, why is it not correct also that the removal of the pressure of the tongue from the teeth of the upper jaw has allowed that arch to become narrower. Is not this the primary cause,—the narrow upper arch not being due so much to the muscular action of the dragging of the lower jaw upon the cheek-muscles as to the absence of muscular action from the tongue not being in position to press upon the teeth? It has been my belief that such was the case. When I find a case where I think there is adenoid tissue I almost always send the patient to a specialist to have that tissue removed, so as not to have muscular action fighting against my efforts all the time.

Dr. Niles.—I would like to ask Dr. Delavan what his experience is in regard to the return of the adenoids after they have been once removed?

Dr. Delavan.—It very rarely—I returns, may say never,—if the hypertrophy is thoroughly removed.

Dr. Niles.—I think effectual treatment requires a very thorough removal of adenoids. It is customary in Boston for both medical and dental practitioners to refer patients to Dr. Hooper or some specialist in this line, who has had a great deal of experience in the removal of these growths. Last winter Dr. Hooper, I understand, operated upon some two hundred patients for this trouble alone. I think it is a very important operation, and requires great care when thoroughly performed. If there is extensive adenoid growth, the patient may have to be etherized, and we all know that operations in the vicinity of the pharynx are dangerous when the patient is thoroughly etherized, from the liability of the blood to get into the trachea, and I should hesitate to take the risk of such operations in my practice when others have better facilities for performing them. Dr. Hooper and others have devised instruments for

the removal of growths and for cutting or scraping the parts that could not as well be accomplished, as Dr. Dwinelle has suggested, with the finger-nail.

Dr. Atkinson.—I am not happy to stand in the position I do at all, because I know the difficult task I have before me of trying to make myself understood as I mean. If I were to say with child-like simplicity what I have in mind just as it comes to me, it might seem to be very severe. The question has almost gone by default, as against the dentists; yet we all know more on this subject than any man has manifested to-night. I do not expect to be helped very largely by simple references to our reaching after cause. That seems to have been in the mind of every one who has spoken; the etiological character of the trouble seems to have been the onus bearing upon each one's mind, and of which we know next to nothing. One gentleman spoke of the bones being thickened and becoming enlarged by reason of the obstruction of nasal breathing. Do we know anything of the morphology of bones? What is the first stage of the long bones? What is the process of reducing the callos that unites a fractured long bone? It is the boring out of the medullary canal and establishing a canal inside of the bony shaft. No one seems to have thought of that at all. I want to say that I pity the man who will shed blood in dealing with adenoid growths; hence the removal of such growths with the fingers or with instruments is the making of one's self a lieutenant of his Satanic Majesty. I thought I had delineated these cases sufficiently before dentists to have them at least comprehend the first line or the letter "A" in the alphabet of the histology and embryology of the subject. This is too long a subject, and too deeply involved, to profitably speak upon without getting either heart-broken or mad.

I am not capable of being angry any more. I can have my feelings hurt, but I cannot get angry. I have had so much cause to fight the assumption of knowledge where it was not properly held in possession by those assuming it that I have learned to be very patient and very tremulous and very much agitated whenever I look over these questions. Before this Society I have delineated a case where more than thirty operations were made for adenoid growths, upon the superior maxilla and the soft palate, upon the alveolar ridge, the uvula, and behind the curtain of the soft palate, up into the upper air-passages, and down to the epiglottis, and into the upper end of the cesophagus. Thirty operations were made, simply drawing together the albuminous epithelium covering the papillæ and wetting them with a saturated

solution of salicylic acid in ninety-five per cent. alcohol until it was cooked like the white of an egg. This case was one where an upper set of artificial teeth had been worn for years. It was treated once in two to four days, I think; sometimes every day. The growth was removed successfully, and the casts which I have to show you will, to any man who manifests ordinary intelligence in such matters, speak for themselves. The best diagnosis is to let the case tell its own story.

In operating in that way, be careful not to pull off the eschar of salicylate of albumen as it comes there. That which came from the soft palate and the uvula was so soft that I could not preserve it. I have some thirteen of the casts left. Each time the eschar would be removed it was dressed until it was white with the salicylic acid, then plaster of Paris was carried up and allowed to flow over until it completely reproduced the coaptation of the plate against the roof of the mouth. Each time the plaster cast was removed it was set aside, the parts dressed, and plaster again applied. I saw the red eyes of the papillæ, but I did not see a drop of blood in the whole nine or ten weeks occupied in the operations. I have repeated this so much, and with so little interest manifested, and so little comprehension, further than a little flash for the time being, that I am almost discouraged. I pity the man who uses instruments to remove adenoid growths from any portion of the air-passages. You should never make the blood come. You should never go below the epithelium, the Malpighian layer. You should never take that away. If you do, you have made it impossible to get the best results. I need only refer anatomists to the fact of the Malpighian layer being built up by, first, globular, then cylindrical, then cuboidal, flattened, squamous, pavement epithelium, until you come to the thinnest on the surface, to let them understand that all that needs to be taken away, all that can profitably be taken away, is the mucous follicle, and not to go into the connective tissue constituting the corium of the skin. The connective tissue and the blood-vessels should never be interfered with.

I have not seen a man show a mental grip of this subject tonight that you could not get by simply listening fifteen minutes before a specimen. I will be happy to show any man this case that I speak of, because I am so sure it is the biggest thing ever done on the planet respecting this kind of surgery that I am very much in earnest about it.

If you have comprehended what I have said, and have any con-

fidence in my veracity and mental soundness, I need not say anything more. I could go into the highways and by-ways of the histological and embryological transformations that take place in the mouth and give the apprehensions that have been presented to my own consciousness in endeavoring to comprehend the condition of the situation, but I doubt whether there has been a sufficient amount of interest taken in it, or a sufficiently earnest determination to conquer the difficulty, to do any more than the president said, to be afraid of it. That is because we did not get a sufficient grasp of it to be satisfied that we had the truth.

Dr. Ottolengui.—It is not at all necessary for me to substantiate anything that Dr. Atkinson says, because we all know him and believe him, but this case that he has related I saw, through his kindness, and I can say that it was certainly the most remarkable thing that I ever saw, in view of its first condition and the permanent results. It was about that case I was thinking when I asked what the treatment had been in these cases, because I was desirous of bringing out the treatment used by others. It will pay any man to go down to Dr. Atkinson's and see the casts of that case. I feel very grateful to him indeed for allowing me to see the case day after day. Not the least remarkable result was the improvement in the general health of the patient, from a state of nervous prostration and anæmia to one of general good appetite and health,—normal reaction.

Dr. Allan.—Mr. President, I want to ask a question. Cannot that adenoid hypertrophy be a result, as well as a cause, of mouth-breathing? Is it not just as liable to be one as the other?

Dr. Delavan.—Mr. President, the question of adenoid hypertrophy of the pharynx has now been studied for about twenty years. In 1868, Professor Meyer wrote an article in which he first called direct attention to the importance of this question. It was known long ago that there existed collections of adenoid tissue in the vault of the pharynx, but not until Dr. Meyer's time was its importance recognized. The influences of adenoid hypertrophy upon the well-being of the child was explained more or less fully by Dr. Meyer. They have since been undergoing constant investigation, and many new facts have been added. It is now a question not of the study of an occasional case, but of the observation which has been going on for twenty years in the hands of men in this country and in Europe, upon thousands and even tens of thousands of patients. What has been stated here has been learned through accumulated facts and statistics. The literature of this subject is large, and con-

stantly increasing. To answer the question of the last speaker directly, it is universally held, so far as I know, that the adenoid hypertrophy is the cause of mouth-breathing. Nor can I conceive of any good reason why the contrary should be the case. It is a very difficult thing to settle problems such as confront us in these cases of deformity of the hard palate. The only way by which our knowledge of the subject can be advanced is by the careful study of the cases which present themselves, and the comparison of ideas through such open discussion as we have had to-night. I have not sought to claim anything, but have simply laid before you certain facts as concisely as I could, and have presented such views as have already been recorded as clearly as possible, hoping that, through comparison of experience and opinion, something of advantage might finally be learned.

As to the various causes stated, they are entirely hypothetical, and possibly none of them may be true; they are the best, however, that have thus far been advanced.

With regard to the question raised as to the influence of the tongue upon the deformities of the hard palate, it is undoubtedly true that for the proper development of the mouth the tongue should be in its normal situation, and if it drop with the lower jaw, certainly the development of the roof of the mouth will suffer from its absence.

I should have explained, perhaps, more fully the nature of adenoid growths. Adenoid growths, such as I refer to, are confined mostly to the roof of the pharynx or to the uppermost portion of the posterior wall of the pharynx. They do not descend to the middle of the pharynx, nor do they extend to the epiglottis. An adenoid of fairly good size would be about the size of an enlarged tonsil. Tonsils can be removed with the fingers, but we have better means of operating on them. I have performed operations where the adenoid growths were so soft that with one stroke of the instrument they came away, although a large mass was present. On the other hand, such growths are sometimes very firm, and the older the child the firmer they are apt to be. I have found them in a child, as young as six years of age, so exceedingly dense and tough that no human finger could have removed them.

In view of these facts, since the question of methods of operating has been raised,—although I did not intend to touch upon that at all this evening,—I will say that it is not altogether an easy or simple matter to extract these growths in some of the more important cases that come to us. The operation is a painful one, and

without an anæsthetic the child is apt to be severely frightened as well as hurt. Indeed, the effect upon the nervous system is far from beneficial. I have operated since 1878 on these growths, and generally prefer to administer an anæsthetic, unless my patient is pretty well developed, unless he is over fourteen years of age, and unless the growth is small, it is much better that an anæsthetic be used.

In the first place, unless the growth be thoroughly removed the trouble will not be satisfactorily relieved; and in the second place, in order to perform the operation thoroughly and easily, it is necessary that the patient should be in a certain position, and that the services of a trained assistant be employed.

With regard to mouth-breathing, it is not every case of adenoid hypertrophy which is associated with it. A very large adenoid growth in the pharynx may sometimes be found where the patient is not a mouth-breather, and where there is no deformity of the dental arch or the hard palate. This seems good proof of the fact that occlusion of the nose is the cause of mouth-breathing, and that it has something to do with the deformity of the palate. Where the inspiratory function is maintained through the nose we do not find it deformed or ill developed.

The operation of removing adenoid growths I consider an important one, and it is my practice to keep young patients in bed, sometimes for two days, and to place them at once upon a good course of tonic treatment, and guard them carefully until healing has taken place. It is remarkable to observe the change in the condition of the patient upon the removal of a large adenoid growth. A child, who has been operated upon, will receive, the instant the growth is taken away, a large accession of oxygen, the effect of which is sometimes very exhilarating. The improvement is so plainly evident that the child knows it and feels it. I have known a child of four years old to call attention to improved symptoms which it did not seem possible that one of that age could notice.

I want to say that the object of this paper was to call attention to the connection of adenoid growths with deformity of the hard palate. We are far from knowing all that can be learned about it. But you know more about it, probably, than any others, because you are constantly thrown in contact with this class of patients. When a patient comes to me with projecting front teeth and this high arch palate, I invariably expect to find adenoid hypertrophy of the pharynx, and am rarely disappointed. A patient is sure to suffer harm from the presence of adenoid during the period of con-

structive activity, no matter if it does disappear when they are grown; then the harm is done, the hearing is impaired, the arch is deformed, and various conditions have become more or less irremediable. It is therefore important that these growths should be removed as early as possible during childhood. The earliest case operated upon that I know of was one of Dr. Hooper's, a child of eight months. I have also operated upon a child of eight months, and also upon several children who were not over fourteen months old, and always with beneficial results.

An infant at the breast nursing is in a very uncomfortable position when it has an adenoid growth that prevents it from breathing through the nose. In sucking, a child must breathe through the nose, or he must drop the nipple to breathe through the mouth. Therefore it is never too early to recognize the trouble; and I can assure you, from the experience of hundreds of observers, that it is very necessary to relieve it at the earliest possible time.

The means by which we operate vary. Time is lacking to describe them, and it is not the object of my paper to do so.

The best way, it seems to me, is to first recognize the condition thoroughly; then to find out what operation is necessary, and the very moment that it can be reasonably made, perform it.

This is a trouble that must often come within the range of your observation, and I think our discussion to-night will tend to direct a little more interest to it, and perhaps throw some light upon it.

Dr. Niles.—In regard to the tendency to absorption, I would like to ask Professor Delavan just how far we should be influenced in recommending operations for the removal of adenoid growths; whether in his opinion there are cases which should not be operated upon, trusting to absorption later in life? Dr. Hooper, I think, operated in a case he showed me where the patient was twenty-four years of age, and I think he exhibited another case of a six-months-old infant on which he operated.

Dr. Delavan.—The question is a very important one. The age varies greatly. I have a patient under treatment now aged fifty-four years, and I have operated on a number who were over forty. I have never operated on a patient as young as six months. These cases, Meyer says, may be treated with success locally in some instances. In some, constitutional treatment—the administration of cod-liver oil and sending the patient to a better climate, and making applications, such as iodine, to the vault of the pharynx—may do away with the growth. The cases, however, are exceptional.

There are three varieties of the growth,—*first*, those which need

not be operated upon; *second*, a class which may yield to treatment and may not, and which, after treatment for a reasonable length of time, should not be looked upon as curable in that way, but in which further treatment would be time wasted,—operating should be adopted; and, *third*, a class upon which any local treatment will not have the slightest effect. In these cases it is a waste of time and money to the patients to temporize with them; they will have to be operated upon sooner or later, and the sooner, under favorable conditions, the better.

Dr. Dwinelle.—I feel that we are under great obligations to the doctor for the very interesting entertainment he has given us this evening, and I will move that the thanks of the Society be extended to Dr. Delavan for the very able, interesting, and entertaining essay of the evening.

Dr. Dwinelle's motion was carried.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,
Editor New York Odontological Society.

AMERICAN ACADEMY OF DENTAL SCIENCE.¹

THE American Academy of Dental Science held its regular monthly meeting March 5, 1890, in the Boston Medical Library Association rooms, President Seabury in the chair.

President Seabury.—If there are no reports of committees, the next thing in order is Dr. Brackett's paper "Concerning Third Molars."

(For Dr. Brackett's paper, see page 10.)

President Seabury.—The matter is now open for discussion and general remarks.

Dr. Chandler.—This matter of the non-appearance of the wisdom tooth is, I think, very common, and getting to be more so every day. I have seen quite a number of instances among my patients where it had never appeared, and in many other cases there was a sort of a beany look to the tooth which seemed to indicate a want of development. I myself have had but three of my

¹ These proceedings have been delayed by the non-reception of the paper of Dr. Brackett, and are necessarily published out of the regular order.—[Ed.]

wisdom teeth, and those were extracted very shortly after appearing. It also seems to me that the lateral is disappearing in the same way. I have seen quite a number of instances of it, and I remember one patient where the upper six-year molars were extracted on both sides in the usual routine way practised almost universally some years ago. The lady never had the laterals, and the consequence was that the upper centrals shut inside of the under teeth. When she came to me she was about thirty years of age, a young lady in society, and quite sensitive as to the appearance of her teeth. I began a course of regulating, and succeeded in getting them to bite square, but I was never able to do anything more, as she gave it up there, being satisfied with what she had gained.

With reference to the rank of the wisdom tooth in the tables which Dr. Brackett has read from Magitot and Hitchcock, I think there is a fallacy in those tables that has not been noticed, and that is, that the wisdom teeth are twelve years younger than the first molars, and consequently have twelve years more chance. To reckon the comparative durability of the wisdom teeth without allowing for this advantage is not just. The canines come after the six-year molars, then the twelve-year molars, and the eighteen-year molars; and there are hundreds of first molars extracted before the third molars make their appearance. It is just so with the hair and the whiskers,—the color of the hair always turns first, and you will find it so universally; apparently it is the difference in the age.

Dr. Fillebrown.—Perhaps Dr. Brackett would like a little company for his cases of paralysis. Some six or eight years ago a lady, who had been a patient of mine for a long time, came to me with a left inferior third molar crowded, and with much inflammation in the parts around it. It seemed best to extract it. I experienced no difficulty in performing the operation, had no hesitancy in deciding that it was the best thing to do, and there was no reason to expect injury to result. A decided paralysis of the inferior maxillary nerve followed, and, with little improvement, has continued to this day. In the whole left mental region of the face sensation is considerably less than normal. There was also a little motor paralysis, which has almost disappeared, but the sensory paralysis remains. It is not serious, only uncomfortable, as Dr. Brackett remarked in regard to some of his patients. I can fully corroborate the statement of Dr. Brackett with regard to the irregularity which the third molar causes when there is lack of room. I have observed

it in a number of cases where the teeth, before the eruption of the third molars, were entirely regular in front, evenly situated, and the cuspids properly in position.

When the third molars did appear, the incisors became irregular and remained so. I have seen that in four or five different cases, and it has seemed to me that if the third molar had been taken out a little sooner there would have been no trouble of that kind. This effect of the third molars is more marked in the lower jaw. I do feel that there is a tendency to an elimination of the third molar. I am not fully up on the doctrine of evolution. Its general principles I believe in, but whether a man is an ape or not I am not fully decided, though a good many of them act like it.

I don't know whether evolution would be able to take a tooth out of mankind, or whether we would have to wait until some higher order is developed from this lower order which we call man. One thing we know that, going back among animals, we find that a complete set of teeth numbered forty-four, and, as I understand it, there have been eliminated in all twelve teeth, leaving thirty-two for the animal man. I suspect that these eliminations have been controlled by necessity. A thing that is not needed is very apt to cease to exist. You let a race go on for generations and not use a hand or an arm, or any other part of the body, you would find the unused member growing smaller, and eventually it would cease to exist. In our higher civilized races of men the necessity for teeth is not so great as it was among the animals that had forty-four, so the tendency is to decrease the number. If the number of a complete set of teeth has been decreased by twelve down to thirty-two, I see no reason why it should not be still further decreased to twenty-eight, and I believe that that is the tendency.

I was interested in these cases of impacted third molars that Dr. Brackett mentioned. I have had several cases of this kind, but have very seldom found it necessary to remove the second molar; in fact, I remember of but one case where I thought it necessary. In several instances I have ground off the third molar, as Dr. Brackett has represented. In other cases I have ground it a little, impacted rubber between it and the second molar, and gradually moved them apart so as to raise the crown of the third molar by that of the second. I would say that I have generally used the Physick forceps for extracting the third molars; and usually it will elevate them from their position remarkably quick and easy. A while since I had a patient who needed to have an upper third molar extracted. Within two years two dentists (I

was one) had expended their full force upon the tooth, using the ordinary forceps, without being able to move it from its position. Subsequently I ventured to use the Physick forceps. It was the first time I had used it in the upper jaw, fearing the breaking of the tuberosity. It was one of the greatest successes of my life. The tooth was removed with ease, and there were no signs of fracture. The patient was a surgeon, and understood the difficulty of the operation, and we were both much pleased at the result.

Dr. Meriam.—There is such a judicial character about all of Dr. Brackett's work that we can hardly hope to improve upon it. One case that I have had, and which I have spoken of here before, was very much worse than anything which he has mentioned. It was a case of impacted third molar, where the tooth was inclined so much that the distal surface was uppermost, and doing duty as a grinding surface, and the anterior cusps were locked behind the sound molar beneath the gum. I did what I have never heard of being done before,—drilled into the tooth far enough to employ arsenic to destroy the pulp, then with a hard rubber and corundum disk made a cut just in front of the distal cusps as far down as possible, then with a fissure bur, with end sharpened like a drill, drilled through to the membranes beneath. I drilled standing at the back of the chair and drawing the cheek back as much as possible. I followed the first drilling with a safe-end fissure bur of the right size, and, cutting laterally, soon removed a section representing fully a third of the crown; the tooth was then removed without difficulty, greatly to the satisfaction of my patient, for the tooth had distressed him very much, and its extraction had been dreaded both by himself and practitioners who had seen it. I include myself especially in the timid ones. But one morning the spirit moved me, and I "was bold." We can, I think, save much suffering by first destroying the pulps of teeth we are to grind or divide, previous to extraction.

Dr. Briggs.—It would seem that any one, after listening to Dr. Brackett's admirable paper, would have to be possessed of considerable temerity to announce a different method, but I have had cases of impacted third molars where I have extracted the second molar and produced good results. I have a very high opinion of the third molar, as high as of any tooth in the mouth, and I think that its faults are due to its environment,—that it is more sinned against than sinning, and that placed as far forward in the mouth as another tooth, it is as good a tooth as we have, but being placed as it is, with the cheek lying upon it, thereby rendering it impossible for

the brush to reach it and keep it clean, it of course decays rapidly and becomes troublesome. In those cases, I think, oftentimes the third molar should be taken out, and I do extract them.

In cases where they erupt almost completely, but do not come up entirely, because they meet the upper molar and the bite in the angle of the jaw is so short, I have seen considerable suppuration around the tooth which I have supposed was due to a pocket between the gum and the tooth caused by the non-attachment of gum to the enamel. In some cases I have cured it by grinding an upper or lower molar until it could erupt further. When it is advisable to make more room to prevent the third molar from crowding, I have had cases in which I have taken out the second molar. In those cases of the third molar erupting a very small portion of its crown accompanied with a great deal of pain of the neuralgic sort, spreading about the jaws and the head, I have extracted the second molar, and in all the cases that I have so done, the neuralgia has been cured, and the third molar has swung into line perfectly, and has been an excellent tooth, as good, if not better, than the second molar, and I have also found in most of those cases that the second molar was more or less injured by the impact. It had become absorbed at the point of contact, hollowing in so as to make a shoulder,—a place away down out of the way,—which would, in the future, produce a cavity capable of quickly reaching the pulp. This fact has added to the causes of my congratulation at having taken out the second molar.

Dr. Fillebrown.—I can keep Dr. Briggs company in his view of the matter. One case presented itself to me not long ago in which I extracted an impacted third molar with great difficulty. I had to grind away the tooth and use rubber to separate, and it took a long time before I could get at the tooth to extract it, when, lo and behold! the distal surface of the second molar was a nest of decay. If I had taken out the second molar, it would have been a great deal better for the patient and have saved us both considerable time and trouble.

Dr. Andrews.—I recall one or two instances in which the extraction of a third molar gave me a good deal of trouble. Twenty years ago I had a case in which I broke the points of two pairs of forceps and spent nearly two hours in trying to extract a wisdom tooth,—and strange to say the gentleman is still a patient of mine. The tooth inclined forward, and was butting against the twelve-year molar, and was entirely under the gum.

I tried quite a while to get hold of the tooth, but the instrument

would slip. Finally, with the engine, I drilled a couple of holes to hold the points of the cow-horn forceps, and was able to extract the tooth. This method is not original with me; somebody told me of it. In this case it worked admirably.

Dr. Williams.—I was very glad to hear in Dr. Brackett's excellent paper that he does not absolutely condemn the wisdom tooth. Patients often say, when I have spoken of filling a cavity in a wisdom tooth. Is it not better to throw it away? But I tell them I have seen wisdom teeth outlast all the others, and sometimes become valuable supports in retaining artificial sets. There are several things about them in which they differ from other teeth, and one thing that I have noticed is that the dentine is apt to be more sensitive than the average of dentine of the other molars, in fact, nearly resembling pulp sensitiveness. My attention was first called to it through an experience of my own. I had considerable trouble with an upper left wisdom tooth, and, like many of our patients, I bore it for a week or two before I decided to have it attended to. I thought, from the sensation, that it was the result of pulp exposure, and made a statement to that effect to the dentist to whom I applied. He, having a slight opinion of wisdom teeth, said that it had better come out, and out it came. On glancing at it, we found that simply the enamel was decayed through. It was the dentine which had given me all the trouble, and I have since found in wisdom teeth that the sensation of the dentine often is very similar to the sensation of an exposed pulp, therefore I make that allowance always.

As Dr. Briggs has said, the wisdom teeth are sometimes the cause of general neuralgia. I remember a patient, a lady, who had been treated six months for neuralgia, and she repeatedly suggested that the teeth might have something to do with it, and finally decided to have them extracted. She came to me, and I saw that they were very important teeth for chewing, but the pulps were exposed. I told her that very possibly her neuralgia came from them, and that if she had plenty of teeth she might be able to do without the troublesome ones, but that, under the circumstances, I thought it would be better to fill and save them. She consented, and those teeth lasted her for years. The physician had to stop his treatment, as the case ended as far as it required medical treatment. I do not know but that they are still in her mouth.

In regard to those cases where the wisdom teeth impinge against the second molar I have had some very complicated cases and, of course, have had my experience in trying to extract them. I, too, have tried the grinding process. In some cases, by a very slight

grinding with a diamond disk, I have obtained just the chance, if there was no chance before, to pack some cotton between the second and third molars, then I have put a waxed tape between them, after that perhaps increased the folds, so that the tooth as it grew and pressed against the other tooth would have a chance to slide up. In several cases there has been success in this way.

Dr. Chandler.—Speaking of the evolution of the wisdom teeth out of the jaw, I have one case where it seems to be evolving the other way. The patient is a man fully fifty-five years of age, and he has six wisdom teeth, two of course being supernumeraries. Four of them are in the lower jaw, and they are all perfectly formed and in good condition, and he has a very good set of teeth otherwise, and a pretty large jaw. There they stand and are likely to stand until he dies. It is the only case of the sort that I have ever had in my practice.

Dr. Andrews.—I spoke of a case of that kind at our meeting in Cambridge, in which there were four extra teeth, making eight wisdom teeth in one mouth. I gave the name of the patient—a lady residing in Tiverton, R. I.—to Dr. Brackett, thinking he might have an opportunity of seeing this remarkable case.

President Seabury.—Since our last meeting I extracted a wisdom tooth for an old lady who must have been certainly seventy-five years old. She had an upper set of false teeth. It showed but a small point at the surface, but I got out as perfect a tooth as I ever saw. The roots were straight and unusually long.

Dr. Hitchcock.—I would like to relate a peculiar case I once had of a wisdom tooth, which I came across in connection with Dr. Werner. The patient was a lady of about sixty-five years of age, who wore an artificial upper denture. The trouble began by a swelling away back in the mouth on the right upper side, followed by a discharge of pus. Examination with a probe resulted in finding, about three-fourths of an inch up, a hard substance, which moved, about readily, being surrounded by more or less dense bone. This substance, on being removed, was found to be a nodule, covered with enamel, evidently a partially-formed wisdom tooth.

Dr. Stevens.—I would like to say just one word, and that is with regard to extracting those lower wisdom teeth. I think if Dr. Brackett had an elevator similar to one which I have, he could have extracted the tooth of which he spoke without breaking it off, or without being obliged to put the patient under the influence of ether. An examination will show the wisdom tooth to hook backward, and therefore the force to be used in extraction should be

applied in a way to unhook it. The elevator that I use is an ordinary elevator, so small as to be carried down between the tooth and the socket,—not using the twelve-year molar as a fulcrum at all, but using ordinary force in pressing it down, and then lifting it and turning it backward to unhook the tooth, and in this way they can be taken out remarkably easy. It is called the Coolidge elevator. I think Dr. Andrews has one. It is made with a large and long handle, and is so well adapted for extracting the wisdom tooth that I seldom use the forceps.

Dr. Banfield.—I would like to ask Dr. Brackett if he has noticed any disturbance of the wisdom teeth similar to that of a patient of mine? A young man of about twenty-four years came to my office, saying that he had been confined to his bed for nearly two weeks on account of supposed disturbance of his wisdom tooth. An examination found his teeth in good condition, but around the right inferior wisdom tooth the gum was considerably inflamed, which he said had given him much trouble; but the most peculiar feature was the dark-red color of the free margin of his gums, for one-eighth of an inch all around on both the upper and lower jaws. I have recently had a few cases of disturbance of the wisdom teeth, complicated with severe gingivitis, that made its appearance at the same time the patient was afflicted with la grippe.

President Seabury.—The next business is "Incidents of Practice and Presentation of Specimens."

Dr. E. G. Tucker exhibited a case of crown- and bridge-work that he inserted in a lady's mouth in 1844, and which was worn with satisfaction forty-five years, until 1889. The teeth were porcelain, carved, single teeth (left upper central incisor and right and left upper canines), set on gold plate, with gold pivots attached, and the three gold pivots were inserted into the hickory pivots which had previously been placed in the roots.

Dr. Meriam.—Mr. President, I present here some fine platinum and iridium tubes. I had them made some twelve or more years ago, and showed them at some of the society meetings. I do not think their value was understood at that time, for they received but little attention. The number of small syringe-points that are used now make me think that they are worth speaking of again. I have them here on a card just as they came back from the Minneapolis exhibit of 1889. They are useful for hollow posts and in making pieces for regulating, and for fine syringe-points. The smallest size is smaller than the finest tube now offered for sale; it telescopes into and can then be hard-soldered into the next

larger size, this into the next larger, and so on, allowing for the making of a great variety of points. A foot of this tubing costs but a trifle. I gave my directions for making to Mr. George A. Warren, No. 7 Tremont Row, Boston. I did not, in the language of the trade journals, suggest them to him, and any one who wishes can order them made by him. It would be better, perhaps, for those at a distance to find some good workman, and after instructing him in their making, report his name to the dental societies in the vicinity, so that a greater number of practitioners will know how easy it is to obtain them.

Dr. Williams.—I have had several of them made, and I have found them very useful.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy Dental Science.

UNION DENTAL MEETING, HELD IN BOSTON, MASSACHUSETTS, OCTOBER 28 TO 31, 1890. •

THE meeting was called to order Tuesday evening, October 28, 7.30 P.M.

Dr. C. W. Clement, Manchester, N. H., president of the New England Dental Society, on taking the chair, delivered a short and appropriate address, congratulating the members on the interest which had brought them together, the size of the meeting, and the growth of the profession.

The first paper called for was on "Professional Ethics," by Dr. S. B. Bartholomew, Springfield, Mass. (For this paper, see page 17.)

Dr. Bartholomew was warmly congratulated at the conclusion of his paper. Brief discussion followed, Drs. Baker and Hoffman being the principal speakers.

Dr. L. D. Shepard, of Boston, was then called upon to give some account of the Dental Section of the Tenth International Medical Congress at Berlin. This was done in Dr. Shepard's best style, from which was gathered that the social features were with the physicians largely the most successful, the polyglot character of the congress detracting much from the interest that would otherwise have been manifested in both the papers and discussions. A feature which was especially noticeable was the almost complete ignoring of the dental element in all the social gathering; where there were three or four hundred physicians bidden by invitation, not more

than three or four dentists would be among the guests. As a scientific body it was far inferior to either London or Washington, D.C.

Wednesday Morning.

Convened at 9.30 in the clinic room and laboratory of the Boston Dental College Infirmary, 563 Tremont Street. This was an occasion of interest, the operators advertised, with two exceptions, being present.

Dr. George A. Young, of Concord, N. H., illustrated well the applicability of soft gold-foil in filling large cavities by placing twelve or fourteen sheets of No. 3 gold-foil in a large distal cavity of a superior bicuspid. The foil was rolled by the operator into loose cylinders, and in this shape was readily placed in position and thoroughly condensed, the whole operation being completed in thirty minutes with as beautiful adaptation of the gold to the peripheral walls of the cavity as could be desired. Economy in time and a minimum tax upon the nervous energies of the patient were claimed as a desired result.

Dr. C. B. Erichson, of New Britain, Conn., exhibited the apparently very successful result of two superior bicuspids implanted in natural sockets, from which had been removed worthless roots. The operation had been performed two years previously, and the teeth were, as regards firmness, color, adaptation, and freedom from irritation in surrounding tissues, all that could be desired. The same gentleman also exhibited one which had been in the mouth four years, where the socket was artificial, which was in an equally good condition. The unfortunate part of these beautiful results was that the operator was unable to state positively whether these teeth possessed on their roots dried peridental membrane, or whether they were entirely denuded of this tissue. The antiseptic treatment, both before and after the operation, was carefully regarded.

Dr. D. F. Keefe, Providence, R. I., exhibited and carefully described a case with treatment of compound fracture of the inferior maxilla. This patient was a student, aged twenty, who came under his care July 3, 1890. The accident was the result of a severe blow upon the jaw while sparring with a friend. The examination disclosed a compound fracture of inferior maxilla, between the second bicuspid and first molar, on left side, and a simple fracture at the symphysis. There was considerable pain and swelling, and, although the first molar was very loose, it was not extracted.

An impression was first taken of the parts in modelling compound. The fragments were then placed in position and a modified Barton bandage applied. The patient was instructed to spray the mouth with listerine, full strength, every fifteen minutes, and to use as a mouth-wash every hour Thiersch's solution,—

R Salicylic acid, gr. i ;
Boracic acid, gr. vi ;
Water, \bar{z} i.

The swelling rapidly disappeared, so that the bandage had to be reapplied.

July 12. Pain and swelling increased. Interdental splint inserted, the parts placed in perfect apposition, and a modified Barton bandage again applied.

July 15. Swelling almost entirely disappeared ; patient slept well, has no pain, and says the splint is not the least uncomfortable.

July 19. Patient feels extremely comfortable.

August 14. Patient has been seen every three or four days since last entry, but nothing of note transpired. Interdental splint removed, and upon examination found union quite firm, and advised the patient to be careful for the next few weeks in using the jaw.

August 28. Bony union complete and patient discharged.

The manner of making the interdental splint is worthy of note : From the impression taken immediately following the accident a cast was made which represented the parts out of position. This was sawed in two between the molar and bicuspid and at the symphysis, the parts then placed in normal position, and a nicely-finished vulcanized rubber cap made for the lower jaw, which was worn, as above stated, with comfort and very satisfactory results.

Dr. W. R. Blackstone, Manchester, N. H., placed a large contour filling of soft and cohesive gold-foil, the body of the cavity being filled with soft foil, while the external and projecting surface of the filling was built up with cohesive gold. Result very satisfactory.

Dr. George Evans, of New York City, placed a gold crown or cap, taking a pulpless root, thoroughly drilling it out to the apex, antisepting it, and adjusting his gold crown. Some hours were spent in the operation, but the result displayed painstaking and artistic work.

Dr. M. B. Buckley, of Boston, for the instruction of those desiring it, cast several aluminum plates.

(To be continued.)

Editorial.

AMERICAN DENTAL DEGREES IN ENGLAND.

THE American degree in England and on the Continent has been a subject of much controversy for many years. The disposition of this vexed question has in part been settled in Germany, Austria, Switzerland, etc., by a refusal to recognize any foreign degree, dental or medical. The same feeling seems to be growing in France, though we are not aware that it has, as yet, formulated into laws to prevent practice in that country.

In England the condition of things has been anomalous; but the tendency seems to be now to drive all Americans from practice in Great Britain.

The decision of the Medical Council was that the degrees of the Dental School of Harvard University and the Dental Department of the University of Michigan should alone be recognized. This decision has been repeatedly appealed from, but without any effect, and it remains in force at the present time. From what can be gathered through private sources, there has been added to this decision legal measures intended to drive out of the country all Americans employed as assistants to dentists. Tempted by a certain remuneration, quite a number of young graduates have accepted positions as assistants, but these must now return home. As far as they are concerned, this will, probably, end to their best interests.

It is understood that the Americans practising dentistry in London are fast leaving, and that those who remain will, with few exceptions, suffer professional and social ostracism.

It is not the place for one outside of a nationality to criticise the means taken to protect the class interests contained therein; but professional ties should, at least, be broader than governmental lines and free from the narrow prejudice of nationality.

The law of the British Council, if we may be permitted to give an opinion, has always had in it the elements of weakness. It has assumed to decide that, with two exceptions, all dental colleges in this country were unworthy of its high consideration. The two thus recognized, while excellent in themselves, have in no degree

any superiority over those cast beyond the pale. The irritation which this action has caused does not concern us here; but the inconsistency of the measure is so marked that it is surprising that it has not been discovered by the ever-active English mind. The selection may have been a very wise one as to quality, but it must ever remain in history as a remarkable procedure. It is probable that our English cousins are beginning to realize the fact, from the disposition manifest to show no mercy in any direction.

If a suggestion may be permitted, it would seem to be the proper course, now that a change has been attempted, to make a clear sweep of all legal tolerance, and refuse to recognize any school on this side of the Atlantic. This would be, at least, consistent, but to what extent it may fulfil professional requirements may be a subject for future consideration.

The right of each nationality to put up the professional bars cannot be disputed. It is the right of self-protection; but in doing so, there can be no question but that the profession so using them lowers itself to the business standard of ethics, which means, strictly rendered, every one for himself. It is recognized that the areas of possibilities in securing a living are being narrowed yearly and are vastly more circumscribed in the old than in the new countries; yet it is not clear that the time has arrived for the institution of professional exclusiveness.

The average American has been so trained that it is impossible for him to understand why he cannot go anywhere in the wide world and settle, as he welcomes the wide world to come to him, and is, necessarily, startled at the police arrangements which metaphorically show him the door the moment he undertakes to invade the professional life of the people. All this is supremely selfish; but it is natural, and will come to the inhabitants of this country as soon as the lines have become so contracted as to bear heavily on the means of obtaining a livelihood.

All that can be, in reason, asked of our English *confrères* is that if they are determined to drive some Americans beyond British soil, not to stop there, but proceed to close the doors upon all and refuse to recognize any American school. This is the only course for the dental profession in England to accept; and while its adoption might work temporary injury to a few, it would, at least, place the profession of that country on tenable ground, where it does not, at present, stand.

KOCH'S TREATMENT OF TUBERCULOSIS.

THE uncertainty which has followed this treatment from the beginning still remains, and, possibly, it will continue to be a subject of mingled doubt and interest to the medical profession and of painful expectancy to the afflicted for some time to come.

The reports received from Berlin have not been encouraging, but it is to be hoped that the question may reach a settlement at an early period; and this result is all the more likely to be attained, since the area of clinical observation has been widened and transferred to the critical tests of the entire medical world.

The report of "The Tuberculosis Commission" of the University of Pennsylvania has just been issued in the form of a bulletin in the *University Medical Magazine*. This contains a full summary of the clinical results achieved up to date, December 15.

The report says, "In regard to the nature of the new remedy, there is absolutely nothing known."

It is shown to be a very dangerous remedy, as the report confirms the general statement that "cases in the late stages of pulmonary consumption are not suited to this treatment." So far as is now known, infections practised upon such patients are liable to result fatally. In view of the fact that the remedy has now reached many localities on this side, it cannot be long before definite results will be arrived at, though it may take several years to determine the question in all its relations.

This whole matter has so thoroughly and so properly claimed the interest of the medical profession that the more serious ethical side has, apparently, not been taken into consideration.

This may be stated in the form of a query: Has the medical profession abandoned the safe ground of learning everything in regard to the origin and testing all articles introduced before adopting them in practice? The answer would, doubtless, be given in the negative; yet the evidence would go far to indicate that the professions and practice of the past had not been lived up to in the present instance.

There may be a difference as wide as the ocean in regard to the origin and value of a proprietary remedy and that discovered by Koch; but the consistency that would denounce the one as empirical and make use of the other, a secret preparation, does not impress itself strongly on the average mind.

It is to be regretted that public clamor should have influenced

to a departure from the old and safe mode of open explanation and thorough testing in private before public announcement. As the case stands, there is sure to be disappointment and chagrin in store for those who advised and adopted the present course. The motive which actuated Dr. Koch in keeping the preparation a secret does honor to him as a man, but it is unfortunate for his reputation and that of the entire medical profession that it was adopted.

BIBLIOGRAPHY.

THE MICRO-ORGANISMS OF THE HUMAN MOUTH; the Local and General Diseases which are caused by them. By WILLOUGHBY D. MILLER, D.D.S., M.D. 128 illustrations, one chromo-lithographic and two photo-micrographic plates. The S. S. White Dental Manufacturing Company. Philadelphia, 1890.

English readers have waited with a good deal of interest the authorized edition of this work, directly from the hands of the author. Its preparation must have involved Professor Miller in a labor that exceeded that of the original German edition, as a translation is more laborious than the original work; but it has been most successfully accomplished, and it can now be judged with intelligence and discrimination.

The preface opens with an allusion to a great and much-neglected truth which every one, without exception, should heed, that the mouth is a culture place unsurpassed, and should be the principal battle-ground in the warfare against disease.

"It has been established beyond all question that myriads of micro-organisms are constantly present in the human mouth, and that these, under favorable circumstances, are capable of manifesting an action of the utmost significance upon the local as well as the general health of the patient. Not alone are they responsible for the vast majority of those diseases of the teeth and contiguous parts which the dental profession is called upon to treat, but they also give rise to other local and general disorders of the most serious nature. . . .

"The existence of a most excellent nursery for bacteria at the very portal of the human body is a fact which has only recently begun to receive the attention which its importance demands."

The first three chapters are devoted to the instruction of those

who have not given special attention to bacteriological studies. This is very essential, for otherwise the contents would be incomprehensible to many. Even with these very lucid pages, it may be presumed that one not familiar with micro-organisms will still find it difficult to arrive at a realizing sense of these invisible forms.

A consoling fact is alluded to on page 13, which deprives these low forms of life of continuing power. The author alludes to the struggle for supremacy as follows: "The principle of the struggle for existence and of natural selection plays an important, though not fully understood, part in the life of bacteria. If we bring a number of different kinds of bacteria into a common culture medium, it will be found that they do not all develop with equal rapidity; one kind will always attain the supremacy. If we infect a second nutrient medium with this culture and continue the operation through a series of generations, we may find that at last only one kind remains, the others having been crowded out. It depends upon the composition of the solution, the temperature, and various other conditions, as to which species will gain the victory. It may also happen that at first one kind prevails, and that later, through a change in the character of the medium, another kind gains the upper hand; or, again, in one part of the medium—for example, on the surface—one kind may prevail, in another part another. In the human mouth this struggle for existence seems to play an important part." . . . Again: "The growth and ferment activity of bacteria are always more or less influenced by their own waste products. Lactic acid fermentation not only ceases when the acidity of the solution has reached 0.75 to 0.80 per cent., but the bacteria themselves are often destroyed by the action of the acid which they have produced."

The following quotation will explain many peculiar and diverse influences so frequently found puzzling pathologists. "Pathogenic bacteria exert very different and diverse influences upon different species of animals. An animal of one species may manifest symptoms of disorder soon after inoculation, while members of another species may remain altogether unaffected by it. Even different varieties of one and the same species do not always manifest the same degree of susceptibility when inoculated with the same bacterium; *e.g.*, house mice inoculated with the bacillus of mouse septicaemia in a skin pocket, succumb within forty to sixty hours, whereas field mice suffer no inconvenience from the inoculation. Koch explains this phenomenon by the difference of the blood of these two nearly-related varieties."

Under the head of "Putrefaction" the following, of interest, is selected: "The appearance of putrefactive products in any fermentation does not depend alone upon the kind of fermentation and the kind of bacterium, but more especially upon simultaneously-occurring processes which have little or nothing whatever to do with the decomposition of the decaying substance. If, for instance, a tooth-pulp decomposes in a closed root-canal, an incredible amount of bad-smelling gas may be formed, so that, on opening the pulp-chamber, the whole room will be impregnated with the odor. But if a tooth-pulp be allowed to decompose in the open air, hardly any disagreeable smell will be noticed, although the decomposition of the nutrient medium caused by the fungi may be identical in both cases.

Under "Nutrient Media for Bacteria in the Oral Cavity," the author considers the liability of pure saliva undergoing putrefaction, and says, "Pure saliva exposed to the air undergoes putrefaction, not as rapidly, however, as is generally asserted in text-books of physiology; on the contrary, sometimes very slowly, so that no bad smell may be detected before several days have elapsed. Only when the saliva is mixed with organic matter from the mouth does it show marked signs of putrefaction. . . . The view entertained by many dentists that saliva possesses antiseptic properties seems to me to be unfounded."

Those who carelessly bruise the gums with clamps, ligatures, or bands may find the following more than suggestive; it may be a warning that should not go unheeded. "The gums, when irritated by accumulations of tartar or food, or by sharp edges, protruding fillings, roots, etc., furnish particularly favorable conditions of nutrition for certain species of bacteria. The apparently strictly obligatory parasitic bacteria of the mouth, *Spirochaete dentium* and *Spirillum sputigenum*, find here the peculiar conditions essential to their development."

The methods of bacterial investigation, covering many pages, is of deep and vital interest to the worker in this direction, but must be passed over with the simple remark, that the clearness of illustration should make it a simple matter for one familiar with the microscope to follow the methods described.

On the biological studies of the "Bacteria of the Human Mouth," the author calls special attention to the well-known form, *Leptothrix buccalis*, and disposes of the claims of certain histologists in this summary manner. "*Leptothrix buccalis* is a name chosen by Robin for those organisms in the human mouth which were formerly

described as animalculæ, tooth animalcules, Bühlmann's fibres, denticolæ, etc. . . . Morphologically as well as physiologically considered, *Lepthotrix buccalis* has been regarded as a veritable wonder. It has been said to perforate and split up teeth, its elements to cause all kinds of diseases in the oral cavity, to penetrate into the lungs, the stomach, and other parts of the body, and everywhere to manifest a destructive influence. As absolutely nothing was known concerning the biology and pathogenesis of this organism, all sorts of wonderful properties were ascribed to it. It is high time to banish this confusing name from bacteriological writings."

The whole of this portion of the work should be closely followed. It is profusely illustrated, and will give a clearer idea of the various forms and characteristics than would be possible by any number of quotations. It is impossible, however, to omit a portion of his views on "Chromogenic Mouth Bacteria." "I have found in the human mouth and isolated no less than eight different kinds of bacteria, which produce a yellow pigment, not including the well-known yellow sarcina. These bacteria are themselves yellow, but do not impart any color to the culture medium. . . .

"I have made a great many attempts to cultivate the supposed bacterium of green stain, but so far without success. I have indeed isolated five different species of bacteria from the mouth which impart a green color to the culture-media, although themselves colorless, but I do not bring any of them into causal connection with the green stain, since, as far as my observation goes, the bacterium of green stain, if there be such a thing, does not grow on gelatine. . . .

"I have recently isolated a bacterium from the mouth . . . which, cultivated on the surface of nutritive agar-agar, imparts to the medium . . . a yellowish-brown color which gradually darkens."

After describing other forms and some experiments that the "black color of the putrid pulps might be accounted for by the formation of the sulphide of iron," he says, "Whether sulphide of iron may be formed through decay of the dentine or enamel in sufficient quantity to aid in discoloring the same, I cannot say; at present I doubt it."

On page 96 the important topic is discussed, "The Bacteria of Diseased Pulp." After stating that he can "only communicate the results" of investigations, he says, "It has, moreover, appeared to me that in cultures from such pulps I have not, as a rule, found the large number of different kinds of bacteria which may usually be found in the mouth. . . . It may, therefore, readily occur that a

putrid pulp does not contain a single bacterium capable of development."

The following from the same chapter is so at variance with generally-received opinions that some may find it difficult to accept it: "It often happens that a tooth, which has occasioned no disturbance for years, in spite of a necrotic pulp, will exhibit a severe inflammation of the pericementum a few hours after the pulp chamber has been opened. . . .

"An attempt has been made to ascribe this very unpleasant result to an infection of the pulp occasioned by germs from the air. . . . This idea deserves to be ranked among the many other wonderful theories of olden times." The question is then argued on the basis that the "pure air in Berlin was found to contain, on the average, 0.1 to 0.5 bacteria per litre," and then concludes that "pericementitis, after opening into a pulp-chamber, is due solely to the carelessness or helplessness of the operator. He either forces particles of the putrid pulp through the foramen apicale, or introduces new infected fermentable matter into the root-canal from without, or occasions an infection by means of unclean instruments."

While experiments have long since demonstrated that air in certain localities is nearly devoid of bacteria, and in others they appear to exist "in minute clouds, with interspaces devoid of any," it is not safe to assume that the ingress of air plays no part in the infection that does certainly take place. The writer of this is not prepared to accept the conclusion that this is due to carelessness. Those who are familiar with the treatment of this class of teeth for the past forty years are perfectly cognizant of the fact that no class of operations have received more attention or were more dreaded than these. The certainty that the opening into a so-called dead tooth would eventuate in pericementitis in a few hours, caused the dentist to hesitate, and when forced to act to use the utmost caution. Before the days of known antisepsis and more intelligent ideas in regard to microbial infection, it was natural to ascribe this sudden change to spores in the air. Admitting the calculations of the author to be correct, the explanation fails to meet all the difficulties in the case. Careful operators were as cautious in the "olden times" as now. The opening was made, and the subsequent treatment was performed by slow and oftentimes tedious repetitions of engagements, and yet, despite this care, pericementitis followed in most cases. The use of creosote and carbolic acid was almost universal, and this, according to our author, will prevent bacteria in one to five thousand. What is the result now? In the same

hands, followed immediately with careful antiseptic treatment, the percentage of loss is reduced to almost nothing; indeed, the possibility of pericementitis is not ordinarily taken into consideration. Is this due to more careful sterilization of instruments, or to exclusion of air? It will not do to assert too much, and it would be equally rash to accept the author's conclusions without further evidence.

In chapter vi., page 119, the author opens the subject of "The Decay of the Teeth." As this is the basis of the entire work, it is, naturally, the most interesting to the dental reader. There is a very liberal elucidation of the older theories of caries before giving the "Original Investigations of the Decay of the Teeth."

It is difficult to pass over this, the most important in the entire book; but to quote sparingly would be to give imperfect renderings of this work, where every page is filled with matter of vital moment, and to quote in full would be impossible in the limits allowed for this review. The subject must be left to the careful reader, with the assurance that no one unprejudiced can arise from the examination of the text, illustrated as it is, without a conviction that this labor has been most thoroughly done, and that all causes of error have been eliminated from the conclusions as far as human foresight and care could accomplish it. Miller's work in this particular direction has been so long before the world, that the idea may prevail that this book is simply a repetition of his periodical work. The fact is, that the old results have been so enriched by constant reinvestigations, that it seems to have all the character of an original production. This is increased by the addition of many illustrations, and especially of four photo-micrographic pictures,—

a. "A longitudinal section of decayed dentine, showing infection with micrococci, bacilli, and threads."

b. "Longitudinal section of decayed dentine, showing infection with micrococci."

c. "Diagonal section of decayed dentine. Infection with micrococci, bacilli, and screw forms."

d. "Longitudinal section of dentine artificially decayed. Infection with bacilli."

These are very perfect, and illustrate most satisfactorily the several conditions. The credit of this most excellent piece of work in micro-photography belongs to Dr. Carl Günther, of Berlin.

The scientific world is familiar now with the fact that Dr. Miller, through long, patient, and ever repeated investigations, demonstrated the cause of caries and, as it were, proved his own conclu-

sions by producing caries out of the mouth, and this to the satisfaction of all capable of judging. Nothing was left unattempted that seemed to militate against observed facts. The tests were conclusive, and in these pages the story is told, and is from beginning to end one of the most remarkable exhibits of patient research, perseverance amid many difficulties, combined with a determined purpose to leave nothing unattained.

The importance which the author gives to the oral cavity as a nursery for bacteria, already quoted, leads to the impression that he will devote considerable attention to prophylactic measures, and this is borne out in the very thorough treatment of this important subject, "Prophylaxis of Dental Decay." In this the relative value of different agents is considered in detail, followed by the antiseptic action of filling-materials, a subject made familiar by recent publications of the author.

Under sterilization of teeth for implantation the following is taken as expressing Dr. Miller's views. After quoting cases showing the danger of this operation, he says, "In my judgment the dentist who undertakes the above operation without having previously convinced himself that the tooth to be implanted is in a perfectly aseptic condition, or most certainly contains no specific germs, commits a serious wrong.

"But how can we thoroughly sterilize a tooth? We must, in the first place, reconcile ourselves to the fact that a complete sterilization of a suspected tooth with the conservation of the periosteum is absolutely out of the question. It is not alone necessary to sterilize the surface of the tooth, but the whole substance of the tooth; and since under certain circumstances the cement-lacunæ, as well as the dentinal tubules, may contain bacteria, it is not to be supposed for a moment that we can reach and kill them in these portions without injuring the pericementum. The transplantation or implantation of a tooth with living pericementum is, therefore, practicable only in such cases where the tooth is taken directly from a living, perfectly healthy individual, and placed at once, under antiseptic precautions, into the alveolus. . . . The usual method of disinfection, placing the teeth in dilute solutions of bichloride of mercury for a few minutes or even hours, gives no guarantee that the teeth are made absolutely sterile. . . . A certain sterilization, however, can be effected by heat alone, either by boiling water or by steam at 100° C. . . . It will be necessary to repeat the sterilization process two or three times at intervals of about twelve hours."

It would give great pleasure to the writer and would add in-

terest to this article to quote from Part II., "The Pathogenic Mouth Bacteria and the Diseases which they Produce," but space is not at command for further comment. It is thorough and most valuable, and should be carefully studied. Indeed, this can be said of the entire book.

In concluding this review the feeling is prominent that the closing chapters open up to all classes of general and special workers in diseased conditions a field of thought that cannot with safety be neglected. Every line of it carries its own lesson, a lesson filled with important bearings on pathological studies and calculated to arouse serious conceptions of duty. The dental profession has received many such from inside as well as outside the ranks. The recent article in the August and September numbers of this journal, by L. Duncan Bulkley, M.D., is an important contribution to this subject.

This work as a whole cannot be read in a day, a week, or a month; but must be studied in every part with a definite purpose. That this study will be facilitated by some previous knowledge of the subject is true, but the clear descriptive text and still clearer illustrations make it a comparatively easy task for the untrained in microscopic work to follow the author.

Any review must necessarily be incomplete; but sufficient has been given to show that in its line of work it has no equal; indeed, nothing comparable to it has appeared. That it covers the whole subject could not be expected, as bacteriology is comparatively in its infancy, and Professor Miller himself shows that he considers his labors but at the beginning, for he says, "Any one, therefore, who continues the search for oral bacteria by means of the modern culture method, for a long period of time, will continually meet with new kinds."

It is impossible to leave the book without expressing the satisfaction with the results obtained by the publishers, S. S. White Dental Manufacturing Company.

The additional micro-photographs, not in the German edition, add greatly to the elucidation of dental caries. These, together with the unexceptionable character of the production in the line of book-making, gives a work above criticism in every respect.

Obituary.

WILLIAM W. FOUCHÉ, D.D.S.

DR. WILLIAM W. FOUCHÉ died in Philadelphia, November 13, 1890, of gastritis. He had reached his seventy-seventh year, retaining a remarkable activity until the close of his life.

Dr. Fouché was born in New York City, September 29, 1814. He obtained his first instruction in dentistry in the office of Dr. Samuel S. Fitch, of that city.

In 1834 he located in Philadelphia, and commenced, in this city, the practice of his chosen profession, receiving the honorary degree of Doctor of Dental Surgery from the Philadelphia College of Dental Surgery at the close of its first session, in the spring of 1853.

Dr. Fouché was one of the promoters and early members of the Pennsylvania Association of Dental Surgeons, which was organized in 1845. The younger members who are now living will remember the interest he took in the discussion of subjects before that body. In 1852 he was elected its president.

For many years Dr. Fouché was a member of the Board of Corporators of the Pennsylvania College of Dental Surgery. Of this Board he was secretary during most of the years of his connection with it.

On July 5, 1838, he married Miss Mary Wilson, who, with two sons and two daughters, survives him.

The commercial talent, which is so rare with professional men, was possessed by Dr. Fouché in an eminent degree, and, as a result of this, he left a large estate for the benefit of the surviving members of his family.

P.

Current News.

TO THE PRACTITIONERS OF DENTISTRY THROUGH- OUT THE WORLD.

THE Southern and the American Dental Associations, at their respective annual meetings held during the past summer, by *unanimous* vote of each body declared in favor of utilizing the great occasion of the World's Columbian Exposition, to be held in Chicago in 1893, by organizing a world's meeting of the practitioners of dentistry, to be held at the same time and place, August 31, to September 10, 1893.

In pursuance of this resolution a committee of five from each body was appointed, and the joint committee so created was authorized to add five more to its membership, thus constituting an Executive Committee, clothed with full power to take such action as in its judgment it should deem best to carry out the objects of its organization, such action to be final and binding.

This Executive Committee is composed as follows:

APPOINTED BY THE SOUTHERN DENTAL ASSOCIATION.

L. D. Carpenter, Atlanta, Ga.; J. Y. Crawford, Nashville, Tenn.; W. J. Barton, Paris, Tex.; J. Taft, Cincinnati, Ohio; C. S. Stockton, Newark, N. J.

APPOINTED BY THE AMERICAN DENTAL ASSOCIATION.

L. D. Shepard, Boston, Mass.; W. W. Walker, New York City, N. Y.; A. O. Hunt, Iowa City, Iowa; H. B. Noble, Washington, D. C.; Geo. W. McElhaney, Columbus, Ga.

ELECTED BY JOINT COMMITTEE.

J. C. Storey, Dallas, Tex.; M. W. Foster, Baltimore, Md.; A. W. Harlan, Chicago, Ill.; C. S. Marshall, Chicago, Ill.; J. H. McKellops, St. Louis, Mo.

The Executive Committee have elected the following as its officers:

President, W. W. Walker; Secretary, A. O. Hunt; Treasurer, C. S. Marshall.

It has also adopted a constitution for its government, and decided upon the future organization of the following committees:

1. A Finance Committee.
2. A Programme Committee.
3. A Committee on Exhibits.
4. A Committee on Transportation.
5. A Committee on Reception.
6. A Committee on Registration.
7. A Committee on Printing.
8. A Committee of Conference with State and Local Societies.
9. A Committee on Dental Legislation in this and other countries.
10. An Auditing Committee.
11. A Committee on Invitation.
12. A Committee on Membership.
13. A Committee on Educational and Literary Exhibit.
14. A Committee on Clinics in Operative Dentistry and Oral Surgery.
15. A Committee on Prosthetic Dentistry.

The objects had in view by the two great representative bodies authorizing and inaugurating the movement for the holding of

THE WORLD'S COLUMBIAN DENTAL MEETING

are thus broadly and tersely set forth by the Executive Committee:

"The bringing together for professional, scientific, and social purposes the dentists of the United States and of all other countries."

It is the desire, as it will be the effort, of the Executive Committee to so justify the trust reposed in it that the contemplated meeting shall prove a brilliant and long-to-be-remembered success. It stands pledged to do whatever may be in its power to make the occasion contribute notably to the elevation of the profession, to stimulate the spirit of research, to strengthen fraternal courtesy, and to promote cordial co-operation among all who desire the advancement of dental science and art. The aim would be too limited, if it included less than this, and the enterprise will be a failure if it fall short of a realization of this ambition.

For the accomplishment of these objects the hearty assistance of every college Faculty, of every State and local society, and of every reputable dental practitioner is earnestly solicited.

All practising dentists outside of the United States are cordially invited to participate in the meeting, without contributory cost;

and there is reason to believe that the invitation will be accepted by large numbers of foreign dentists.

We desire and expect the presence of distinguished representative dentists from almost every civilized country, and nearly all of note in our own country, resulting in the largest gathering of dental practitioners in the history of the world.

Information as to the progress of the work will be communicated through the journals from time to time, and, meanwhile, every dentist is urged to do all in his power to forward the objects sought.

In behalf of the Executive Committee,

W. W. WALKER,
President.

67 WEST NINTH STREET, NEW YORK CITY.

NEW JERSEY EXAMINATIONS.—The New Jersey Dental Commission will hold its next meeting for examinations in Orange, N. J., on Tuesday, January 20, 1891.

Persons intending to begin the practice of dentistry in New Jersey must make application to the secretary of the Board prior to January 6, 1891.

G. CARLETON BROWN,
Secretary.

ELIZABETH, N. J., December 12, 1890.

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No. 2.

Original Communications.¹

INTER-DENTAL SPLINTS.²

BY ALONZO P. BEALE, D.D.S., PHILADELPHIA.

It affords me great pleasure to be with you on this occasion, and to be honored with an invitation to read an essay before the Society.

The title of my paper, as you have observed, is "Inter-Dental Splints,"—splints to be used in treating cases of fracture of the lower jaw. The subject is not a new one by any means, but is one worthy of our attention for a short time.

It is not my intention to enter into a detailed account of the treatment of fractured jaws, but simply to give a complete description of the mechanical details involved in the manufacture of inter-dental splints.

The mechanical principles are simple, and if thoroughly understood and accurately carried out the result will be successful, but if one detail is faultily executed, no matter how carefully the others are performed, the result will be absolute failure.

It is a fact well established that in treating cases of fracture of

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read at the meeting of the Pennsylvania State Dental Society, July 29, 1890.

the inferior maxilla, without the aid of an inter-dental splint, great difficulty is experienced in keeping the fragments in juxtaposition, especially where there is a double fracture.

Although their use is recommended to students in medical colleges, there are still many cases treated in the old way, with simply a submental splint and a bandage, by surgeons who concern themselves but little as to the future comfort or sightliness of the patient.

As the physician or surgeon cannot make an inter-dental splint, he must of necessity call upon the dentist to make it for him; hence every dentist should be perfectly familiar with all the mechanical details requisite for the formation of such an appliance, this being the more necessary as a special splint must be made for each case.

The advantages of the use of such splints are, first, perfect immobility of the fragments, thus securing the best possible condition for union of the fractured bone. Second, a complete restoration of the teeth to their normal articulation, with a consequent avoidance of disfigurement and impairment of the masticating functions.

Although I am a strong advocate of the use of plaster of Paris for taking impressions of all cases for artificial dentures where it can be employed, I have arrived at the conclusion, by experience, that plaster is not the best material to use in taking impressions of fractured jaws. The proper materials are either modelling compounds or one of the various wax preparations. As a first step, an upper impression should be obtained in the usual manner, using as little material as needed to insure success without causing the patient any unnecessary pain or inconvenience in opening the mouth. When taking the lower impression an assistant should stand back of the patient and hold the lower jaw firmly with both hands, being careful to place his index-finger or fingers on the point or points of fracture to prevent separation of the fragments while the impression-material is being pressed into position. Notwithstanding the care just mentioned, more or less movement will take place, which will be apparent when the cast has been poured and removed from the impression.

From these impressions plaster casts should be obtained which should then be accurately articulated.

This is accomplished by cutting the lower cast apart with a small saw at the place or places indicating the fracture, and trimming enough plaster from the sawed surfaces to make the teeth of the lower antagonize properly with those of the upper cast.

When this has been done, the several parts of the lower cast should be held in contact with the upper one and freshly-mixed plaster placed on the base of the lower to fasten the pieces together. When the plaster has set, place the two casts in an articulator. In order to do this correctly it is necessary to know just how far the natural centrals are from the condyloid processes or hinges of the jaw. This distance varies in different individuals, but the average is about three inches and a half. This space should be measured, and the upper cast should be placed in the articulator so that the centrals will be just that far from the hinge of the articulator. Then place the lower cast in the articulator so that the teeth will antagonize with the upper ones.

If the measurement is not taken and the casts are placed too far forward, it will be seen that, when the splint is finished and placed in the mouth, the molars will strike first and will prevent the other teeth from sinking into their proper places. If the casts are placed too far back, the front teeth will strike first and the back teeth will not fit in their proper positions. If either of these unfortunate mistakes should be made, the splint will be a failure, and it will be necessary to take new impressions and make another one. After the casts have been placed in the articulator, the inter-dental spaces should be partially filled with plaster, and any inter-dental dovetail spaces should be so filled as not to cause any impediment to the proper placing of the splint when finished.

When this has been done, the distance the jaws are to be held apart should be decided upon and the articulator so set as to preserve this distance. This space should be wide enough to allow for the free passage of an ordinary feeding-tube.

The plaster teeth, upper and lower, and the portions of the casts representing the gums, about one-quarter of an inch above the teeth, should be covered with heavy tin-foil (No. 60). The object in doing this is to make the splint on its inner aspect a trifle larger than the natural teeth and gums it is to fit over, and to have the tin, by virtue of its thickness, strip from the rubber in the finishing process and leave its inner surface perfectly smooth and finished. After the foil has been burnished to the casts the splint should be modelled in wax. The method preferred is to soften some wax, preferably a mixture of paraffin and wax, and roll it out into sheets about one-twelfth of an inch in thickness. Carefully press this wax over the tin-foil covering of the casts and cut the edges of the wax off a trifle short of the tin so that the foil will extend beyond the wax all around its entire margin. When

the upper and lower base-plates have been made, they should be united with a strip of wax a little more than one-eighth of an inch in thickness, wide enough to fit between the upper and lower wax when the articulator is brought together, and extending as far back as they do. The joints between this strip of wax and the base-plates should be carefully filled with melted wax, and the entire piece nicely smoothed with a spatula. The object in having the tin-foil extend beyond the wax is to have the plaster investment in the flask hold it firmly in position so that it will not become displaced while the rubber is being packed. The casts should be removed from the articulator and their bases pared down so that both casts, with wax in position, can be easily placed in the vulcanizing flask. For this purpose a large, deep flask is requisite.

In flasking, partially fill the lower section with plaster and place the lower cast in it and allow the plaster to cover just half of the wax, thus making the line of separation of the sections of the flask just in the middle of the wax-union between the base-plates. When the plaster has been made smooth, it should be soaped and the flasking finished in the usual manner. When the plaster has hardened, the flask should be placed in warm water and allowed to remain there long enough to soften the wax sufficiently so that the edges of the plaster investment will not be fractured on opening the flask. When the flask is parted, small surplus gates should be made; then the wax should be washed out with boiling water. The wax should not be picked out with instruments, as by so doing the foil might be displaced and the casts broken. When the wax has been removed and the moulds dried, the rubber should be packed, using thin strips and delicate instruments to insure forcing the rubber into every part of the mould. When the moulds are full, place the sections together and the bolts in their places, close the flask, and then vulcanize. If the waxing has been done carefully and neatly, and the piece made as thin as permissible for strength, the vulcanizing can be done precisely as in ordinary cases. When the vulcanizing process is completed and the flask cold, the splint should be taken out of the flask and the plaster removed from it. The tin-foil should be stripped from the rubber and then the finishing should be done in the usual way employed for finishing rubber plates. The double advantage of the heavy tin-foil will be apparent at this stage of the operation. When it is removed from the splint the rubber will be perfectly smooth and also a trifle larger than the parts it is to fit over, which is a decided advantage, as the splint will pass into position easily

and will not require fitting in the final adjustment of the teeth to the splint. There is another method of accomplishing the same result which saves time and work, but which requires decidedly more skill.

After having placed the casts in an articulator and covered the proper portions of them with tin-foil, instead of making the wax form as described, the splint can be made at once of rubber.

First paint the tin-foil with liquid rubber about the consistency of cream, and then place rubber on in suitable strips to form the splint in a manner similar to that pursued in making the wax one, being careful to press the rubber firmly against the models in order to make it stick to the rubber cement. When this has been done, the strip connecting the two should be about two layers of rubber in thickness, and should be nicely fitted between the upper and lower plates and fastened to them. The joints between the rubber can be made smooth by the use of a hot spatula. If care is exercised the rubber can be manipulated and shaped with a hot spatula almost as easily as wax.

When this has been done, the inner space between the upper and lower casts should be filled with plaster before removing them from the articulator. If the casts should be removed from the articulator without this support of plaster between them, the rubber being soft and elastic, the casts might become displaced and the shape and fit of the splint would be ruined.

When the plaster is hard, saw the casts from the articulator and embed the casts and rubber in plaster in the flask; when the investment is hard, proceed with the vulcanizing. The advantage of this method is that it consumes less time than the former one, and the tedious operation of packing the rubber into the small crevices of the mould is done away with.

In the finishing process the opening for feeding purposes and others for cleansing should be made. The one for feeding should be large enough to admit a feeding-tube. If desired, other openings can be made in order to more clearly show when the splint is in its proper position when placed in the mouth.

Splints made in this way are also applicable to fractures of the superior maxillary.

This method of vulcanizing over casts covered with thick tin-foil can be employed in making small vulcanite pieces or caps for correcting irregularities of the teeth, and the piece can be fastened in position by any device requisite for the case in hand.

EROSION.¹

BY WILLIAM H. TRUEMAN, D.D.S., PHILADELPHIA.

ABRASION, erosion, and caries are three peculiar and distinctive processes by which is wrought, through a progressive and gradual loss of tissue, the destruction of the human teeth. They differ in their etiology, probably, as widely as they do in appearance and general characteristics, and yet they seem to be in many cases so linked together, and to follow each other so closely, that it is difficult to assign the injury done to either factor alone. This is not, however, always the case. The injury may be purely a mechanical abrasion, or it may be that erosion or caries exists alone, and the appearances presented are characteristic and unmistakably those of the destructive process concerned.

In looking over the literature of this subject, I find several papers upon erosion devoted almost exclusively to the various forms of receding gums and sensitive dentine associated therewith. I cannot conceive that they have anything in common. Erosion may exist at the necks of teeth, and frequently does, where the gums are quite normal. I have at times found it entirely below the gum-line, with the gum-tissue normally adherent at the lower margin of and completely covering the eroded cavity. While there is usually associated with it, owing to the loss of tissue, an abnormal sensitiveness of the teeth, this is not constant; and, on the other hand, there may be extensive recession of the gum and excessive sensitiveness of the exposed necks of the teeth without the slightest erosion. While these several conditions may jointly exist they are not inseparably associated, but are in origin and history distinctive and independent abnormal conditions.

Until within a few years the etiology of erosion was a closed book. The only theories advanced were either so greatly at variance with frequently-observed facts, or so indefinite, that they received, and were entitled to, but little attention.

Until very recently equally unsatisfactory were the various theories to explain the cause of dental caries. Some were absurdly preposterous; others were reached by close observation and well-considered reasoning, and contained much that we now recognize as true. Not, however, until Dr. W. D. Miller, of Berlin, Germany,

¹ Read at the annual meeting of the New Jersey State Dental Society, July, 1890.

published the results of a long series of carefully-conducted experiments was the real cause of dental caries known. Not until he accomplished it had any investigator, by the application of his own theory, produced dental caries out of the mouth precisely the same as that we so constantly see in the mouth. This was the crowning act of Dr. Miller's patient and persistent investigations. Others before him had demonstrated the presence of fermentable matter in the mouth, the presence of various microscopic fungi there, and in carious cavities in the teeth; but it was reserved for him to demonstrate how these two long-observed factors worked together to produce the effect so frequently noted, and to conclusively solve the perplexing problem. We may not as yet have reaped much practical benefit from the exact knowledge thus acquired, but, knowing the enemy with which we have to contend, it must in the near future make our labors for the arrest and suppression of dental caries more successful and satisfactory. The solving of this problem has encouraged other investigators to step from the beaten track, and we may now hope that persistent and well-directed efforts will, step by step, wrest from erosion the secret of its birth.

Abrasion, which in appearance so nearly simulates and which is so often confounded with erosion, is a purely mechanical removal of tooth-tissue. Its effects are seen more frequently upon the cutting and masticating surfaces; it is, indeed, the natural process by which the cutting edges of the incisors are, after their eruption, wrought to their normal shape, and by which the masticating surfaces of the bicuspids and molars are made to closely articulate. The amount of tissue thus removed, when the dental development is quite normal, is exceedingly small; and although this abrasion ordinarily progresses slowly yet steadily as the years roll on, it does not usually, when confined to these surfaces, entail any serious complications. While its effects are most marked upon the masticating, they are also seen in a less degree upon the approximal surfaces of all the teeth that are in close contact, especially in the middle and later periods of life, when the teeth are apt to become less rigid in their positions. It is here, too, that it is apt to be complicated with erosion and caries, and is largely responsible for approximal cavities developed at this time in dentures that heretofore have been perfectly sound. At this period of life there is usually a natural and normal consolidation or shrinkage; in many cases, indeed, an abnormal recession of gum-tissue, that leaves between the teeth spaces favoring the lodgement of effete matter, or in which the oral secretions are in various ways retained

and there undergo a change that renders them destructive of tooth-tissue. This leads in some cases to the formation of carious cavities; in others it gives place to the more rapid process of tooth-destruction,—caries. This is most frequently observed in, but is not confined to, the posterior teeth. As this observed fact has an important bearing upon our subject, let us examine it a little more closely, confining our attention to the molar teeth.

The approximal surfaces of well-formed molar teeth are so rounded that they present but little surface in contact, this and the gum-tissue, closely filling the space below the line of contact, prevents the undisturbed accumulation of effete matter. By the process of abrasion these rounded surfaces are flattened, and those in contact are thereby enlarged; this and the recession of gum-tissue favors the retention of oral secretions, etc., and the process of erosion begins. This continues slowly until, by loss of tissue, a comparatively large space is formed. This space usually assumes upon each tooth a concave form, and is thus better fitted to collect and retain fermentable matter, and favors the location of tooth-destroying germs which augment and continue the destructive process. This loss of tissue by erosion may quickly open on either tooth a structural defect that furnishes these germs a place for lodgement, and we have quickly formed a large and penetrating cavity. I am well satisfied that this is substantially the history of many approximal cavities that develop in the later periods of life, and I am equally well satisfied that in their formation each of these three destructive processes—abrasion, erosion, and caries—plays a part.

The distinctive characteristics of erosion and the very marked dissimilarity between it and caries, both in appearance and origin, were early noted and its varied modifications accurately described, but beyond suggesting that it was a real and actual solution of tooth-tissue, few writers ventured to account for its presence. But a little observation demonstrated positively that it had a widely-differing origin from abrasion, which in physical characteristics it so closely resembled. While generally admitting that it was a solution of tooth-tissue, that the destructive agent was an acid, the question naturally arose, why should its destructive action be so sharply localized, and why should it exhibit throughout its course rigid and sharply-defined lines? These questions have always been the stumbling-blocks in the way of a tenable theory.

The peculiar and characteristic appearances of abrasion and erosion are so closely similar that in many cases it is, without a history

of the case, impossible to distinguish between them. The lower bicuspid tooth here shown, from the mouth of a patient aged about sixty years, was, except a slight recession of the gum, quite normal. Several of the anterior teeth then had eroded cavities at the gum-margin which have since enlarged, and those teeth, while still retained, have suffered from erosion to a greater extent than this has. I first noticed the erosion upon this tooth shortly after the extraction (made necessary by the recession of the gums and consequent loosening) of several teeth posterior to it, and in six or eight years it progressed to the condition now seen. While in this case the erosion is more marked upon the labial surface, extending two-thirds through the tooth, it is seen also upon the lingual surface, and in a less degree upon both approximal surfaces at the neck of the tooth. I have seen cases closely resembling this where the tooth has been encircled by a narrow clasp supporting a denture, the effect being due to abrasion, or, more probably, abrasion and erosion combined. This tooth, however, has never been clasped, and the injury done is entirely due to erosion.

In illustration of the close resemblance of erosion and abrasion I present this cast of a denture, the first lower molars of which on either side have lost at least two-thirds of their length; the teeth have been gradually reduced from the masticating surface and have as gradually elongated to meet the opposing teeth. This has all taken place, the patient informs me, and my own recollections confirm it, within the last eight years. These two molars are the only teeth so affected in that mouth. It is probable that there was upon their masticating surfaces, when erupted, a malformation of the enamel, there has been no loss of tissue by caries. On the left side, except that the loss is almost entirely upon the lower tooth, the occlusion is such that we might attribute it to abrasion. On the right side, however, it is impossible for the opposing tooth to reach the worn surface of the lower tooth in any position that the jaw may assume. The patient states that she first noticed the wearing of this tooth shortly after the loss of a molar posterior to it. She was then about thirty years of age. The inner integument of the cheeks is quite voluminous, and rests closely against the teeth. On the right side, owing to the position of the upper posterior teeth and the loss of the two lower molars, the integument of the cheek completely covers the masticating surface of the first molar when the mouth is at rest. Have we here an example of erosion upon one side of the mouth and of abrasion upon the other, or is the loss of substance in both teeth

due to erosion? I have no doubt that the enamel upon the masticating surfaces of both teeth was pitted and defective; it is to be stated, however, that no unusual wear was noticed until after the teeth had been in position many years, not, indeed, until the loss of adjacent teeth permitted the soft tissues to encroach upon and overlay the masticating surfaces. Within a year or two there has developed a slight erosion near the necks of several of the anterior teeth that is slowly progressing.

In another case, the upper molar has lost considerable of its masticating surface, and the posterior portion of the same surface of the lower molar immediately under it has also been lost; the loss from the lower tooth extends only so far as it is covered by the upper molar, so that the masticating surfaces of the two teeth form with each other a wide angle, the apex at the line of the anterior approximal surface of the upper molar, with a space between them of some three-eighths of an inch at the posterior approximal line. In this mouth several of the teeth are of defective structure, as shown by a brown discoloration. Both of the teeth we are considering were so marked. There has been upon them no caries, they are not now, nor have they ever been, filled. There is at the junction of the enamel and dentine a sharply-marked depression, otherwise the surfaces are, although somewhat discolored, smooth and perfectly polished. In this case loss of the second lower molar has allowed the integument of the cheek to encroach upon the masticating surfaces of both teeth; this and the defective tissue seem to have been the localizing cause of the erosion, for we may in this case unquestionably attribute the loss of tooth-tissue to that alone.

In the next case we have upon the labial surface of a lower molar an eroded cavity closely resembling those found so frequently upon the labial surfaces of the anterior teeth. The enamel at the lower margin of this cavity formed an extremely sharp, knife-like edge that irritated the patient's cheek. It has been suggested that the initial injury in this case may have been a fracture or scaling off of a portion of the enamel. I am disposed, however, to consider it a case of erosion.

The next case is much more complicated. The patient, aged about fifty-three, has been a tobacco-chewer. As shown by the casts, the line of occlusion is very irregular, and yet by some means the upper and lower teeth have been mutually acted upon, so that the masticating surfaces are in almost perfect contact; indeed, so perfectly do they fit and interlock the one into the other that when the

mouth is closed there is not and cannot be between them the slightest rubbing motion. This is well shown by a narrow ridge upon the cutting edges of both upper centrals immediately over the interspace between the closely-crowded lower incisors opposed to them. The uneven line of occlusion in this case is in striking contrast to the perfectly level surface so frequently seen in dentures worn down by mastication. In this instance there is possibly a sliding motion upon either side as the teeth approach and before they are completely closed; this may have contributed to the very marked loss of tissue. It has been also suggested that this loss of tissue may have been due to abrasion by impact, a wearing away of tooth-tissue by much the same process as that by which granite is wrought into shape, the surface being crushed or abraded by repeated blows of a hammer or of a blunt chisel. Originally, it has been suggested, the loss of tissue began by simple abrasion due to mastication until from some teeth the enamel was entirely worn from the surfaces in contact. The dentine being less resistant and wearing away more rapidly, tended to eventually bring about the uneven occlusion. This restricted the sliding motions of the lower jaw, and the wearing being continued by impact has produced the condition now seen. While giving this plausible theory due weight, I am not disposed to attribute the effect entirely to so slow a process. Undoubtedly it has been going on for years; eight years ago, when I first noticed it, the loss of tissue and the tendency to uneven occlusion was quite marked. I have been impressed, however, by the rapid progress made the last two years; that we have now another factor to consider, and that the destruction commenced by abrasion is now being much more rapidly continued by erosion. Were it abrasion only, I see no reason why it should progress so much more rapidly now than it did a few years ago, the difference in density between the enamel that has been lost and the dentine that is now being worn away not being sufficient to account for it.

These cases are not presented as typical cases of either abrasion or erosion; they all come near the border line; and I question very much that, if shown the teeth extracted from the mouth, the most experienced among us would venture to say whether the loss of tissue was due to abrasion or erosion. In each case I have little question but that the position and appearance of that portion of the teeth which has suffered would be considered sufficient evidence of abrasion. I think you will agree with me, however, that an examination of the casts would lead to a different conclusion. As part of the history of these cases we have the ob-

served fact that the integument of the cheek when the mouth was at rest lay in close contact with that portion of the tooth which has suffered. It is very possible that there may have been a predisposing cause that has assisted to more sharply localize the injury, a cause that may have been, indeed, the initial injury without which the loss of tissue would not have occurred. Be that as it may, undoubtedly this close contact of the integument of the cheek and the tooth has been the passive agent which has held in contact with the tooth the real and active cause of the erosion. I have no question but that in many cases the same destructive agent is in like manner assisted by the contact of occluding surfaces.

I have chosen, in treating this subject, to first trace the close resemblance in the effects produced by abrasion and by erosion, not so much on account of their, at times, close association, but rather from a strong impression that this resemblance may be, in the study of the etiology of erosion, of more importance than is at first seen. To my mind it conclusively proves that, whatever may be the destructive agent concerned in erosion, it is a solvent of tooth-tissue locally applied to, and generated at, the point effected, and excludes the idea that it is due to any general condition of the mouth, or any special or peculiar secretion. The more commonly noted cases of erosion seen at the necks, labial and buccal surfaces of the teeth are so peculiar in their form, position, and relation to each other that no other explanation seems plausible. Indeed, some observers of excellent reputation have been so impressed with the idea that the cause was strictly local, that they have insisted that it was the result of friction and purely mechanical. Others have modified this, and have suggested that it was due to a tooth-solvent assisted by friction, the latter giving to it its peculiar characteristics.

In a paper entitled "A Contribution to the Etiology of Erosion," read before the First District Dental Society, State of New York, October 5, 1886, Dr. Edward C. Kirk, of Philadelphia, makes a real advance in the study of erosion, and cleverly demonstrates its strictly local origin, crediting the suggestion to Dr. James Truman.¹ He says, "Some two years ago, during a discussion, Professor James Truman advanced the idea that erosion is probably due to the solvent action of acid mucus, secreted by the follicles situated in the labial mucous membrane, and that the disease is more active at night, from the fact that during sleep the flow of alkaline secretions from the salivary glands is arrested; hence the acid secretion of the

¹ *Dental Cosmos*, vol. xxix. pp. 55, 56, January, 1887.

mucous follicles is not neutralized to the same extent, if at all, as during the daytime, when the salivary secretion is active. In support of this idea Professor Truman stated that he had caused tests to be made with litmus paper of the labial mucus in the mouths of patients suffering from erosion, by the patients themselves, immediately upon wakening, and each time had found a distinctly acid reaction, and he was led therefore to believe that the disease is to be accounted for upon that ground." Dr. Kirk further says, "As tests which I had formerly made during the daytime had generally failed to show any evidence of acidity of the oral secretions, and impressed by the importance of the suggestion of Dr. Truman, I repeated the litmus test and had patients affected with erosion do the same, under the conditions proposed by him,—viz., blue litmus paper was to be placed between the incisor teeth and the lips, immediately upon wakening and before the salivary secretion has commenced to flow. The papers returned to me for examination were without an exception reddened, thus giving unmistakable evidence of having been in contact with an acid. Repetition of the tests by simply moistening the paper with the labial mucus, while the patient was in the office, generally failed to show any variation from neutrality in reaction. By making the tests with proper precautions, however, results are obtained which are decidedly different from those just mentioned. The method pursued is as follows: After the mouth has been rinsed with water, all adherent mucus and saliva is carefully wiped from the labial mucous membrane with a soft napkin. A double fold of dry napkin is then placed over the eroded teeth, and a piece of moistened blue litmus paper sufficiently large to embrace the whole area of erosion is placed upon the napkin, after which the lip is to be firmly held down upon and in contact with the litmus paper for a full minute.

"Upon removing the paper it will be found distinctly reddened, but the change of color is not uniform over the entire surface, and I desire to lay particular stress upon the appearance presented by the paper after the test is made in the manner just described. It will be found that a series of red spots, corresponding in number and position to the orifices of the labial mucous follicles, are dotted over the paper, which after a short time spread through absorption of the acid, and coalesce to form reddened areas which bear considerable resemblance in configuration to the eroded areas upon the teeth."

Dr. Kirk suggests, "That the litmus paper of commerce is not sufficiently delicate for satisfactory use in these experiments; it

usually contains sufficient alkali in the coloring matter to impair its sensitiveness to very weak or dilute acids. He directs that the litmus solution prepared by the method of the United States Pharmacopœia be divided into equal portions, to one of which is added just enough dilute sulphuric acid to barely make it red; it is then mixed with the other portion. Swedish filter-paper or any pure unsized paper free from alkali, soaked in such solution and dried, will furnish litmus paper of extreme delicacy."

Dr. Kirk states, "That he invariably found that while the mucous membrane immediately overlaying the eroded area is decidedly acid, the secretion from the palatine mucous membrane will frequently be alkaline; the reaction of the mucous membrane generally being neutral or alkaline in all portions with the exception of that contiguous to the eroded teeth."

Naturally the question will arise, Is this acid condition of the mucous membrane immediately overlaying the eroded areas the cause of the erosion? May it not be that the same agent which has caused the erosion has also, by the irritation it has excited in the soft tissues, changed the character of the secretion from that portion of the mucous membrane with which it has been in contact at the same time it was in contact with the tooth. If it is the cause, and erosion is really due to the acidity of these isolated areas of acid-secreting mucous membrane, what has produced the abnormal condition at these particular spots? Is it not singular that these patches of acid-secreting mucous membrane should be situated immediately over the teeth, and at no other portion of the mucous lining of the oral cavity?

In the course of a correspondence upon this subject a few months ago, Professor James Truman suggested the probability that erosion might be due to the oral secretions while the mouth was at rest during sleep, being held in contact with the teeth by the mucus surface of the lips, cheeks, etc.; those portions of the secretions thus isolated, under certain conditions, being prone to undergo a change which rendered them a solvent of tooth-tissue. The more closely that I study the subject the more strongly am I impressed with the reasonableness of this suggested theory. During sleep, when the mouth is at rest, and the muscles are relaxed, naturally the soft tissues of the mouth at some points rest against the teeth. The peculiar confirmation of the teeth and gums, the ridges, rugæ, depressions, etc., of the mucous surfaces form pockets, enclosing, isolating from the mass of the oral secretion, and at points hold in close contact with the teeth for long

periods of time portions of the oral secretions. From and in these portions of isolated oral secretions I have no question but that the tooth-solvent concerned in erosion is evolved. This, however, is but one step in solving the mystery. When we consider the peculiarities of erosion as we meet with it in daily practice, there is still much, even after the destructive agent has been identified and its origin traced, that is difficult to explain. When we fill a cavity formed by rapidly-progressing erosion only a minute fraction of an inch in width, and find that the filling completely arrests the destructive process that may have been going on with increasing rapidity for months, it is hard to realize either that the filling has materially changed the previously existing conditions and thus prevented the formation of the tooth-solvent, or that so small an area should comprise the full extent of surface with which it came in contact. In a majority of cases, in all where erosion is arrested by filling, we must have accomplished the one or the other. In some cases we fail to do either, the filling simply protecting that portion of tooth-surface and that portion only covered by it; the erosion extending outward and beyond the filling-protected area. In exceptional cases, the first manifestation of erosion covers an extended surface upon each affected tooth, and many teeth are affected at about the same period of time, but as a rule, in its first noticeable beginning the area is small, a narrow line, or a depression scarcely exceeding a small pin-head in size. At first its progress is slow, but it is exceedingly progressive. This is undoubtedly due to frequent and fresh applications of the solvent with marvellous exactness to precisely the same point. Whether the erosion is small or extended, the sharply-defined outlines characteristic of erosion is evidence of the exactness with which the solvent has been applied to and confined within a limited space. It is hardly possible that so slowly-acting a solvent would remain undisturbed long enough to produce an appreciable effect except when the mouth is at rest during sleep. We find that in many cases the formation of an eroded cavity may occupy several years, whether we consider it a slowly-progressive, continuous action or a more energetic intermittent one; in either case there has been under constantly changing conditions and at varying intervals, frequent application of the eroding agent at precisely the same spot. That this should take place seems marvellous, and yet, is it any more so than that the thousand and one muscles that our will-power controls so constantly under similar conditions act together so precisely the same that the individual is unerringly recognized by the tone of

the voice or the peculiarities of expression or gait. The probability that complicated muscular movements will, under similar conditions, be accurately reproduced is well recognized in the importance given to the peculiarities of hand-writing and signatures by courts of justice. The settlement of vast estates, even the issues of life or death, have frequently been decided by the similarity in the microscopic wavering of a hair line in a signature. If in the almost automatic yet complicated act of writing, or signing a document, individual peculiarities of muscular movement are so constantly and precisely repeated, I see no reason to doubt that the integument of the mouth should in slumber assume precisely the same positions.

In conclusion: Investigation is often hampered by preconceived notions. Solution is not necessarily a chemical process. The idea that this destructive agent must be an acid having an affinity with the lime-salts of the tooth has little but tradition to support it. The little cap that we frequently see, mainly of enamel, all that remains of a baby molar, is sufficient evidence that there may be, and is, formed in the oral cavity a true solvent of tooth-tissue. I know that this effect has been produced by a normal physiological process; it is, however, none the less a true solution. The study of caries was greatly hindered by the general acceptance of the idea that it must be a chemical change, and much energy and time was wasted in the effort to isolate the acid capable of so peculiarly acting upon tooth-tissue. The process of digestion may in this connection be suggestive. The changes the food undergoes in a well-ordered stomach are to a greater extent physical than chemical, and are due far more to the active agent there secreted than to the acid associated with it. If we can settle the point that the cause of erosion is a strictly local one, that it is not due to a peculiar secretion, but to a change in a small and isolated portion of the normal oral secretion, its mechanism and chemistry will be very much simplified, and we can utilize in its study the knowledge acquired by recent investigations of the changes constantly going on within the oral cavity, largely the result of microbic energy.

WHY HAS THE AMERICAN DENTIST A HIGH REPUTATION THROUGHOUT THE CIVILIZED WORLD?¹

BY DR. C. T. TERRY, MILAN, ITALY.

It is undeniable that we have enjoyed this reputation for many years in all foreign countries as well as in our own. Has it been on account—as many suppose—of our superior dental schools?

We must admit that all schools or colleges for instruction in the professions and sciences are, like common schools for the people, necessary, in order to give all a foundation on which to build, that they may be able to gain at least a livelihood in which ever speciality they have chosen, if not a reputation and fortune.

The man of energy and brain keeps on building on this foundation until disease or old age demands a pause; but, how many there are who receive diplomas, who are not as competent five years after receiving them to practise their professions as they were at the time the diplomas were given. Why? Because they were forced to muster a little energy to get these diplomas, which exhausted all the strength they had and all they ever were to have in this direction, compelling them to fall back on their diplomas alone for a reputation.

In the twenty-five years or more that I have been practising abroad, the question has been asked me perhaps hundreds of times, "Why are the Americans so skilful as dentists?" and how many times have I regretted that I could not answer this question to my satisfaction for want of time.

The general impression prevails that our dental colleges have made us what we are. If our schools have really done this, why did we have a reputation in Europe before a single institution existed in our country for teaching dentistry?

Dr. Brewster established the American dentist's reputation abroad before we had a dental college. Why have we now, and why have we had for years, so many competent dentists and excellent operators who never received instruction in a dental college? If the dental schools can invariably produce excellent operators, why are there so many dentists holding diplomas who cannot hold a dental instrument with steadiness? It is evident that it is not

¹ Read at the Union Meeting, Springfield, Mass., October, 1889.

possible for dental schools to make good dentists out of bad material, any more than it is possible for a literary institution to make all its students poets.

The men of our country who have invented ingenious machines and instruments—many of which have won the admiration of the world—have not been, as a rule, educated in schools of technology.

Wherever you go on the continent, you will see the results of their study, hard work, and ingenious brains. It must be admitted by those who are honest and unprejudiced that great executive ability and superior ingenuity are more general traits among the people of the *United States* than among those of any other civilized country.

When a European comes to an American dentist abroad for treatment, he does not expect to find a mountain of learning or a profound philosopher, but a thoroughly practical man, who won't keep him running a month in order to have the cotton changed which has been crowded between his teeth to get space enough to put your finger in before the cavity can be filled, and toothache enough to drive him wild, but a man who will go right to the spot and do execution. The patient knows by every touch and movement that he has got hold of some one who understands his profession, practically at least. Why is it that there exists so much ability of this kind among the people of the *United States*?

One very good reason is, that we are descended mainly from one of the most practical nations of Europe, and we germinated in a great, free, and new country, where labor was and is respected and encouraged, and where the intelligent class are obliged to help themselves more than in any other country.

Our forefathers were obliged to develop the inventive ability they brought to the new country, in devising labor-saving machines, and their inventions were appreciated, as laborers were scarce. The inventors were respected and their inventions protected by law more than in any other country; therefore, the inventive ability which was sown here has been encouraged until it has developed into a national talent or trait.

Any American who goes abroad cannot help noticing the want of practical ability among the European laborers. The greatest effort appears to be made among them to do things in the most awkward way possible, while our American-born laborers use their brains to ease their muscles.

The peasants and ordinary laborers of Europe make no effort, apparently, to invent labor-saving machinery, and even if they had

the ability, I doubt if they would use it for fear of such machines taking the labor from them.

The aristocracy are very conservative about making the acquaintance of or introducing new things; therefore inventive ability has only been developed among the middle or manufacturing class.

Dentistry as a calling has never been respected on the continent; in any case, not as other learned professions are; and an aristocrat, as far as my experience goes, would not think of educating his son in dentistry. The English aristocracy do not recognize their dentist away from his rooms, notwithstanding that they may have been treated most skilfully and faithfully by him. This I have been told by one of our best and most respected dentists in London.

Callings that are not respected cannot expect to attract as much talent as others, though they may be more remunerative.

Our regard in the United States for all occupations gave dentistry a chance to make a fair start; therefore it immediately called to its field men of talent and superior practical ability; and I believe I am correct in stating that the dental profession in this country can boast of being represented by just as much talent as any other profession.

Its members soon saw the importance of establishing dental schools where a solid foundation could be laid, on which to build a monument composed of the skill, inventive ability, and liberal endeavor of the American dentists of the nineteenth century, which will honor them forever.

What course could be more admirable or more quickly insure a rapid advance in dentistry than that which our more talented brothers in the profession in this country have pursued and are still pursuing towards the less gifted members, in imparting as much knowledge of their ways of practising as possible, and in acknowledging that there should be no secrets from them, excepting in so far as lack of ability prevents them from seeing through and adopting the methods which have been so liberally shown?

How different is the course pursued by foreign dentists! In all the years of my practice abroad, I have never received an invitation from a continental dentist to look on while he operated. This may be accounted for partially by the continental patient's dislike to having others present while being treated, also on account of the dentist's fear of displeasing his patient, or perhaps on account of his own modesty, or that his wonderful method of operating might be stolen! The continental mind is exceedingly cautious and

conservative, and circumstances are not favorable for a rapid practical advance in our specialty; but more is being done at present than ever before, as dental schools are springing up in different parts of the continent, which will establish a higher average in the profession. I am of the opinion that the European dentist has a better theoretical education than we possess (excepting our very *best* dentists, who stand far above all—at home and abroad—both in theoretical and practical knowledge).

Dentistry is thoroughly a practical profession. When a dentist wishes an operation performed in his own mouth, how little he cares for his dental brother's theoretical ability! He wishes to know above all things that he is a superior operator.

This superior ability to operate has given us our reputation, and I believe it is a great mistake for our colleges to decorate so many of their students with diplomas who have not practical ability. As soon as we begin to undervalue this, we may expect to see the gradual decay of our reputations.

I think there is no doubt but that the treatment and cure of serious diseases, both of the body as well as the teeth, will, in the future, be more mechanical than medical, if it is not so already, and the nation which possesses the *greatest* amount of mechanical skill, all things being equal, will be able to do most for the ills and misery of mankind.

INDEPENDENT DENTAL JOURNALISM.¹

BY L. ASHLEY FAUGHT, D.D.S., PHILADELPHIA.

MR. PRESIDENT AND GENTLEMEN,—I have no apology to offer to the profession to-night for inviting attention to the consideration of this subject. The very air for the last six months has been full of it; and while, perhaps, it has never been openly discussed on the floor of any association, it is nevertheless to my mind a topic upon which many, like myself, may desire information; and a comparison of ideas ought not to prove barren of beneficial results. Certainly the floor of an association like this is a fairer field of combat than the pages of any journal, dependent or independent; and the cool impartial opinions of readers and contributors

¹ Read at the meeting of the Odontological Society of Pennsylvania, November 1, 1890.

may weigh more justly in the balance than the mere statements of assertion and denial from persons in more interested positions.

There is no good reason why we should not freely discuss our journals, and I shall open the way for it. If we do not tell each other to-night our thoughts in reference to them, and what we regard as best in them, or needful for their improvement, the omission will not be due to lack of invitation or of opportunity.

In order that we may intelligently discuss the subject, a slight *résumé* may not be inappropriate, and to this end I propose the query, What is the object of dental journalism? The journals of any art, science, trade, or manufacture are primarily the outgrowth of a desire on the part of those most interested in such subjects, though widely separated in point of space, to communicate to each other, for mutual benefit, the progress made and the new ideas developed from day to day; and, secondarily, the result of a wish of their publishers to further their personal interests.

Dental journalism, therefore, found the springs of its birth in a desire to supplement the early meagre college training, and has ever since drawn its life from the veins of a profession to which it relates as a post-graduate course.

The little band of dental pioneers, shivering under the rude cold blast that usually meets early aspirations, turned from the closed doors shut by the powers then in control of the healing art, and sought to nurse the fitful flame of the smouldering spark by sweet communion of kindred hearts. The *Baltimore Dental Journal*, the *Dental Register*, the *New York Dental Recorder*, the *Dental Intelligencer*, and, best of all, the *Dental News Letter*, came into existence, and the dentists who wrote for them, though possessing the doctorate in medicine, signed their articles "John Brown, M.D., Dentist." Too small to properly represent the young nursling, the *Dental News Letter* was succeeded by the *Dental Cosmos*, and the imprint on its first page under the topic, "Our Enterprise," suggests that it seeks to "fairly cover the dentists' world of science and practice;" that "the meaning of the title is exactly the intention of the publishers," and that "the *Dental Cosmos* is pledged to the dental public to do whatever a journal can for the good cause of professional improvement, for the profession's advancement in its usefulness, self-respect, and public regard, and for strengthening fraternal courtesy, justice, and co-operation among the men who have the destiny and responsibility of the profession in their hands." This pledge was amply fulfilled during the succeeding years, and represented all that there was of any note in dental journalism up

to 1872. At this date one whose memory is yet green, and whose professional spirit will ever be revered, in retiring from its editorship, stated that its primary object had ever been "the elevation of the professional standard to the highest possible point of excellence," . . . and "the views advanced have been offered for what they were worth, consulting more what I believed to be the best interests of the profession than what might prove to be popular, . . . and I desire that its record in the future, as an exponent of the interests and aspirations of the profession, should be equal if not superior to the past." With this benediction the *Dental Cosmos* passed from his hands, and in the same number of its issue the publisher states: "It is our intent and earnest desire to make the *Dental Cosmos* a practical exponent of the science and art of dentistry, . . . to supply all that the practical progress of the medical and dental professions can be made to afford." With the mantle of high professional spirit thus falling from the shoulders of one and resting so gracefully upon another, is it a matter of wonder that no true dentist to-day can afford to be without its pages, even though it may have fallen into a popular error?

From about the year 1872 up to the present time, as a result of natural professional progress, and perhaps stimulated from time to time by other minor impelling powers, the journalism of dentistry has greatly multiplied until the immediate furnishing seems most replete.

We sit not down to-day to a meagre table, but we have a choice of viands. It is perhaps inopportune, as well as difficult, to select and indicate any one dish as the most nutritious, but the seasoning in them all calls for notice and seems unpalatable in two respects.

As regards the pepper, most of the cooks seem to be in doubt which will suit best the popular palate,—red or black,—and so they use indiscriminately both,—“profession”—“specialty,”—and those who partake question whether the salt to be used shall be coarse or refined. Now, gentlemen, there are some among us who recognize that the real difficulty lies not in the salt at all, but with the pepper, which ought always to be red and never black. This can be best shown in a consideration of the first word of our title, “Independent Dental Journalism.” The mixture of black and red pepper since 1883 became so evident that, with a view of sparing further infliction to sensitive nerves, I wrote a letter to the *Independent Practitioner*, under date of October 11, 1888, querying what profession could be possibly meant when one used that word again and again in articles on “Dentistry, a Specialty in Medicine?”

I may not be denied here a short quotation from my letter. "Every attentive reader of the dental and medical literature produced during the last five years will recognize the pertinent force of the above query. . . . From the time that Chapin A. Harris and his coadjutors made overtures to the medical colleges, endeavoring to have dental professorships incorporated in them, and the scornful rejection of their propositions, up to about 1883, dentistry was not confounded in thought with medicine by any one. It was understood to have its own literature, colleges, societies, etc.; and the medical fraternity lost no opportunity to give prominence to the fact that dentistry had nothing to do with medicine.¹ Dentistry as an independent profession, however, thrived and grew, and made for itself so prominent a position that its respectability and strength were felt far and wide. Medicine, ever jealous of her supposed prerogative, has noted the healthy pulse, and during the last five years has made great change in her attitude and from her original policy. During this period a persistent attempt has been made by the medical profession to have it understood that dentistry is a specialty in medicine.² The effort has filled our literature with much interesting reading bearing upon the subject, but has in no wise been able to make dentistry a specialty in medicine; but, rather, has continually emphasized the fact that the healing art is in the hands of two great distinct and separate branches,—medicine and dentistry. Each distinct and independent.

Every article that has been written, every speech that has been uttered, advocating dentistry as a specialty in medicine is filled with the expression, "the profession." Such emphasis shows how deeply implanted dentistry is as a "profession."

According to this view the salt has little to do with the taste, for the word "independent" does not concern a consideration of journalism separating from a supposed interest of a particular college, society, or manufacturing establishment (coarse salt), and conducted in the interest of the dental profession, by the profession, of the profession, and for the profession. (Refined salt.)

As another has tritely put it, "The question is not *where* is the literature of a profession purchased, but *what is its character?*" For my own part, gentlemen, if the manufacturer of dental requisites can produce a better journal, it matters not whether it emanates from a shop or a college, and God speed to him who makes journals

¹ See *Dental News Letter*, 1851, p. 109, and *Dental Cosmos*, 1874, p. 325.

² See *Dental Cosmos*, 1887, pp. 135, 405, 460, 516.

more useful to those who subscribe for and read them. Still declining to express an opinion as to which of the many is best, I venture the assertion, without fear of successful contradiction, that the house from which one of them emanates has done much to give to dentistry the cast of an independent profession. We may cut loose from the manufacturers so far as journalism is concerned, and we may by the most strenuous efforts endeavor to attach ourselves to the medical profession as a specialty; but we will never be successful in our identification with the latter, and we will always find ourselves classified with the former, as we now are by the census office, unless we seize upon the true meaning of "independent," and stand up for ourselves, and for what we are, as expressed by our title D.D.S.

Dr. Norman Kingsley voiced this in true old-fashioned Anglo-Saxon when he said, not long since, in speaking of a kindred topic, "Hardly a speaker has been on his feet that has not talked about 'our specialty' and in the next breath about 'our profession.'"

"One gentleman, in his remarks about independent dental journalism, said, what I did not know until this evening, that this Society (New York Odontological) has committed itself unanimously to independent dental journalism. Now, as far as I can find out, the independent dental journalism which this Society has committed itself to, if it has at all, is made up of the veriest twaddle. Independent of what? Independent of a company of publishers that are able to publish a thoroughly creditable journal? Is that independent dental journalism? Not according to my mind at all. Independent dental journalism should represent dentistry in its independence.

"I tell you, gentlemen, that what is now doing more to menace the integrity of the dental profession than all else is not the men who are preparing materials and furnishing goods for dentists' use, but it is the class of men who are trying to attach dentistry to another profession."

This, gentlemen, is the truth,—sound solid truth,—and we ought as dentists to stand up for dentistry as dentistry, and, as an independent profession, engraving upon our cards and putting upon our printed matter, upon our window-sills and upon our door-plates, in fact upon all that goes before the public, not Dr. —, but —, D.D.S., thus acknowledging everywhere that we are dentists, and proud of being dentists; and start out plainly and boldly with real independent dental journalism.

A CASE IN PRACTICE.¹

BY J. G. W. WERNER, D.M.D.

MR. PRESIDENT AND GENTLEMEN,—There is always an unusual interest in those cases that do not occur every day,—that come to us only occasionally and have in them the possibilities of seriousness or even danger. The case that I am about to relate is one of that nature; one that was of considerable pain, trouble, and anxiety to the patient, and greatly interested the operator.

Mrs. D., sixty-seven years old, came to me July 23, 1888, suffering from pain in the right superior maxillary region. Some three years previously I had extracted a loose root from her right upper jaw. It seemed to be the remnant of the third molar. I remember well this extraction, for with it came almost all of the alveolar socket, which was in a soft, black condition, the root itself having exostosis. The wound from this extraction was much longer in healing than in an ordinary case.

Before the patient came to me, as above mentioned, there had been for some time previously a feeling of heaviness, of congestion, of more or less dull, grumbling pain, as if something was wrong deep in the jaw.

On waking one morning, the patient found her pillow stained with saliva and pus, and had a decidedly bad taste. Something had wakened her,—a noise in or near the ear, as if something had broken, followed by sharp twinges of pain. It was after this that she consulted me. On the right side of her face, near the mouth and chin, the skin had a peculiar reddish eruption and was in a high state of irritation. As the patient said, "I was frightened to find my face all broken out, never having had anything like it."

After a few days this irritation and eruption subsided. From the time the patient felt this something giving way, the sharp snap and those twinges of pain, there was considerable pus discharged into the mouth and throat.

As stated, I saw the case first on July 23, and, from the gathering of symptoms, I thought at once either of abscess involving the submaxillary sinus, the inner ear, or the post-nasal and palatal regions.

On examination, the right nostril and the right ear seemed to

¹ Read before the Harvard Odontological Society, December 31, 1890.

be in normal condition, excepting the peculiar noise the patient heard at times in the ear.

On the right upper jaw there was no tooth posterior to the cuspid, that, with the lateral and central incisors, being the only teeth in position. The roof of the mouth was normal, though very flat. The right tonsil was considerably larger than the left; the soft parts between the opening of the parotid-gland duct and the right tonsil were somewhat red and congested. From whence, then, came the pus, the secretion? Apparently there was no opening, and a searching examination, lasting for nearly an hour, did not reveal the cause or the seat of the trouble. Was it abscess, or chronic ulceration of the tonsil, or a suppuration of the parotid gland? Did the pus come through Steno's duct? All this was considered and the parts thoroughly examined. I had nearly given up searching, when, to my great surprise, I found a small opening, situated at the very end of the maxillary bone, at its junction with the soft palate. Into this opening I could press, by using considerable force, the end of a small round burnisher. This much gained at the first sitting, the patient was dismissed with the following:

R Acidi carbolici, ℥iii;
 Listerine, ℥iv;
 Glycerini, ℥ii. M.

Sig.—One teaspoonful in a glass of warm water as a mouth-wash.

On the following day, July 24, the eruption on the face was at its worst. The feeling of a general fulness and uneasiness about the jaw, the ear, and the throat, was as on the preceding day, but there had been no sharp pain, no special noise or snap as if something had given way, or, in other words, there had been considerably less pus discharged in the past twenty-four hours.

I was anxious at the second sitting to arrive at a more definite and satisfactory understanding of the case. It was either a case of abscess in the antrum, a supernumerary and undeveloped tooth, or necrosis of the maxilla, pointing, in my opinion, strongly towards the latter. With suitable probes, I found I could pass in two directions, directly posterior to an extent of over an inch without perceptible obstruction, and about the same distance laterally towards the median line, in the direction of the suture of the two maxillæ, but with some obstruction.

With a lancet the small opening in the soft tissues was enlarged, the whole cavity washed out with warm water, carbolic acid, and oil of cloves. Into the enlarged opening a large pellet of cotton,

saturated with listerine, was crowded. This crowding of cotton into the cavity proved an effectual means of keeping open and further enlarging the orifice, thereby making the examinations easier. The patient was also given instruments and instructions for syringing and packing the cavity every sixth hour, or oftener.

I saw and treated the case daily between the 23d of July and August 1, during which time a considerable number of small pieces of dark fetid bone were loosened and removed. The cavity in the maxilla had now become quite large. With a probe I could now feel something that surprised me, that felt to my touch like the enamel of a tooth. My diagnosis was completed. It was so conclusive to me that then and there I wrote on a piece of paper the following: "Mrs. D. has a supernumerary tooth embedded in the right upper maxillary bone, near the tuberosity, and likely connecting with the antrum. I shall remove it on Friday next." This I gave to the patient with the request to hand it to her family physician and to let me know if he would like to be present and assist me in the operation.

It was the wish of her physician that I should perform the operation, and, being unable to be present or assist me, I procured the assistance of Dr. E. B. Hitchcock. On August 3, 1888, the tooth and pieces of bone you see in this bottle were removed. To extract this tooth from its embedded and inaccessible locality was a very difficult thing to do. It was accomplished after many trials and two hours of hard work. It could have been more easily done if more gum and bone-tissue had been sacrificed, but to avoid doing this was a prime consideration. First, the opening, which was less than half an inch in diameter, was enlarged sufficiently with a bistoury to insert a half-open extracting forceps. Then, with excavators and forceps, small pieces of the bone were removed. In this way the tooth, of which at first only one cusp could be felt, was made more accessible, and eventually became sufficiently loosened to be moved or drawn down considerably. By degrees enough of the bone obstruction was cut away to grasp the tooth with an extracting forceps, with which it was removed. All the roughened surfaces in the maxillary bone were scraped smooth and the whole cavity thoroughly washed out, then packed with cotton saturated with listerine and oil of cloves.

I might mention here that the patient went through the whole operation without an anæsthetic, though everything was prepared for etherization; but the very fact of the patient being conscious assisted very much by enabling us to work more carefully and

intelligently. Very few patients would have stood it without ether, for while the greater portion of the operation was not very painful, some of it was.

The day following the operation, August 4, I dressed the wound; also on August 6. Owing to absence from the city, I did not see the case again until August 22.

The condition of the patient, of the local parts, and the after-treatment, may be summarized as follows: After the operation the patient was considerably exhausted, though, considering her age, her condition was very good. On reaching home, nourishment was taken. She then retired and slept part of the night. The following day patient was up part of the time. In the afternoon she had a chill and felt considerably exhausted,—as she expressed it, “I began to realize what I had been through.” On the second day she felt somewhat better, but had another slight chill. On the third day there was a normal condition,—good appetite, patient was up, and the pain in the head had subsided considerably. For a week or ten days after the operation there was considerable discharge from the cavity, and the parts were very sensitive to the slightest cold. The treatment of the wound, from August 6 to 22, was done by the patient, Dr. Hitchcock seeing the case several times during that interval. After the eighteenth day the packing of the cavity was from day to day lessened, the wound was allowed to heal and fill up from the bottom, and on September 20 it was considered well.

Reports of Society Meetings.

AMERICAN DENTAL ASSOCIATION.—THIRTIETH ANNUAL MEETING, EXCELSIOR SPRINGS, MO., AUGUST 5 TO 8, 1890.

(Continued from page 41.)

Third Day's Proceedings.

THE third day's proceedings of the American Dental Association commenced at the Excelsior Springs, Mo., Opera-House, Thursday, August 7. President M. W. Foster, of Baltimore, Maryland, in the chair.

Dr. Crouse, of Chicago, made a motion that the special order at 7.20 P.M. be the election of officers of the Association.

The motion was carried.

Section 3 was then passed, and Section 4, the Section of Histology and Microscopy was called. Dr. W. X. Sudduth, of Minneapolis, secretary of the section, reported two papers for the evening session, one to be furnished by Dr. Hunt, on the blood-supply of the teeth, the other by Dr. Sudduth, on "Tumors of the Mouth." A brief discussion as to the length of the time that the papers were to be allotted, and as to whether the points presented in the papers were new, was indulged in by Dr. Sudduth, Dr. Truman, Dr. Patrick, Dr. Rhein, Dr. Baldwin, and Dr. Crawford.

Section 4 was passed for the time being and Section 5 called. Dr. Harlan, chairman of Section 5, the Section of Materia Medica and Therapeutics, made the report. The only paper before the section for consideration, and the only one to be considered by the Association, was that upon "Carbolic Acid," by Dr. A. W. Harlan, of Chicago.

In commencing, the speaker gave the history of carbolic acid. It was first discovered by Runge, 1834. He noted the observations of writers upon the subject. The properties of carbolic acid as a disinfectant were then considered; the form that pure phenol assumes; the long, colorless needles. Absolutely pure carbolic acid was first produced in 1871, by Church. He then considered the

anæsthetic properties of carbolic acid. It is so powerful and so irritating that it must be used with the greatest care. John Dougall said, as early as 1870, that carbolic acid was not a powerful germicide. The genuineness of the acid can easily be tested by shaking a drachm of the acid with a pint of warm water. The water will dissolve the pure acid, but will retain the dead oil undissolved. The speaker next alluded to the preparation of synthetic carbolic acid. All had been previously prepared from coal-tar. The price of the synthetic acid is quite reasonable. Experiments have been made to test the relative disinfecting power of synthetic carbolic acid, the comparison being made with the ordinary carbolic acid. It was found that there was very little difference between the two acids. One of the advantages of the synthetic acid is its greater solubility. Carbolic acid has been of great value to modern surgery. It has been used by surgeons and by dentists as much or more than any other drug. Of all the remedial agents, carbolic acid and nitrous oxide have been granted the greatest amount of space in the dental and medical journals. Dr. Harlan then gave the following reasons why the use of carbolic acid should be discarded by dentists:

1. Because of its deleterious action on the pulp: oil of cloves or cassia is preferable to carbolic acid.

2. As a root-canal dressing it is, because of its great solubility in water, not to be depended upon.

3. It is not a chemical disinfectant when brought in contact with sulphuretted hydrogen.

4. When it comes in contact with the dentine it is absolutely useless.

5. Unless combined with oils it is valueless.

6. Its beneficial action is only temporary.

7. As an agent for injection it is without value if there are fine roots that hold fragments of pulp.

8. It does not possess embalming properties.

In conclusion, Dr. Harlan said that the fact that so many pulps live when treated with carbolic acid only tends to prove how nature can be abused and yet continue in its wonderful properties. He held that carbolic acid should take its proper place as a spray or as a local anæsthetic.

Section 5 was next passed, and Section 6 was called. Dr. H. A. Smith, of Ohio, chairman of the section, made the report. He said that in 1882 a resolution was adopted at the Cincinnati meeting, and at the last meeting some action had been taken looking to the

tabulation of prehistoric crania. The adoption of a system of dental notation seems to be absolutely necessary. He held that this examination of the remains of prehistoric crania would have a great value to dentistry and to science. It would determine whether certain evolutionary theories may or may not be reinforced. He said that Dr. Patrick, of Belleville, Ill., had been selected by the Illinois State Dental Society to take charge of the cranial examinations for that organization. He thought that the American Dental Association ought to be congratulated upon having in its ranks one so able and worthy to carry forward a work of this character.

Dr. Patrick then gave a review of his efforts and researches in this direction. He stated that the report that he had to make to the association was supplemental to what he had already remarked at other meetings. He said that this examination was something that he had contemplated for many years. He was desirous of assistance in this particular field of investigation. In this as in other fields of scientific research and labor one man cannot reap all the honors. He had been working at this project and gathering collections of prehistoric crania for twenty years. He reminded his hearers that what it takes one man twenty years to accomplish can be accomplished by twenty men working one year. He said that it was necessary to adopt a system in this work. The crania should be put up and carefully labelled in cases. The diminution in the size and the number of the teeth in the case of dwarfs should be noted. In the case of giants, the augmentation in the size and the number of the teeth should be carefully observed. The speaker then gave the various heads under which the collections are to be divided. He also gave the various points to be guarded against and examined into. Mutilation and fracture should be recorded. Diagrams will be furnished to all who desire to help in this work by the committee. The symbols can be recorded on the cards, and the committee will add up the totals when they come in. The dental like the medical profession is indebted to the earnest work of men laboring along these lines since the fifteenth century. John Hunter, one of the earlier writers upon the teeth, accomplished his work so well and observed things so closely that nothing that he has done has ever been undone.

When a thorough examination is made of the prehistoric crania of the country the dental profession will be rendering to the anatomist and the physiologist vast assistance. We will be returning something for the benefits that we have received from others. When completed, we will have a cloud of witnesses to testify to

the truth of many beliefs and theories. These tables will either approve or disapprove much that is claimed in science. It may clip the wing-feathers of some who desire to fly, but we cannot help that. They must walk the solid earth until content to investigate in a scientific manner. All we ask, all we desire, all we aim at, is the truth, let it hurt whom it will.

Dr. W. S. How, of Philadelphia, secretary of Section 6, next presented a paper on the "Hillischer System of Dental Notation." He said that the *Dental Cosmos*, in 1885, published an article urging the use of symbols in dentistry to describe the teeth. The subject received but little attention in this country at that time, but at the Dental Congress at Paris, last year, "Dental Stenography," as it was called, received favorable consideration. M. Grosheintz communicated a plan for an international system of dental notation. His article attracted considerable attention and was widely commented upon. He gave an account of the various systems proposed in this country and abroad, and described at length the advances made in the art of numbering and classifying the teeth. He congratulated the members of the profession upon the fact that a commencement, at least, had been made in this direction. He thought that the value of these classifications to dentistry and to science would be manifest to all. He demonstrated, in closing, the value of such a system to the different dentists of the country when corresponding with each other regarding different and difficult cases.

Dr. Ottofy, of Illinois, briefly addressed the convention upon implantation. He said that the oldest case that had come under his observation was three years and six months. The tooth was in a perfectly normal and healthy condition until June 1 of this year, when it dropped out. An artificial substitute has since been employed. Dr. Fletcher is having a paper read before the International Dental Congress at the Berlin meeting this year. He has implanted teeth into the hind leg of a goat. The oldest case is over a year old, and the most recent experiments over four months old. In all of these cases absorption has taken place. Photographs have been made showing the implantation to have been made as claimed by Dr. Fletcher.

Dr. Thompson, of Kansas, thought that it did not matter so much what system of notation is adopted, so long as some system is taken up by the dentists and made universal. He hoped that the American Dental Association would take steps looking to the adoption of something in this direction.

Dr. Smith, of Ohio, thought that some one system should be adopted, and the earlier that action is taken upon this subject the better. He was of the opinion that the system adopted by France and Germany could be used with good effect.

Dr. Smith, of Colorado, then proceeded to explain by means of the black-board his system of dental notation. He had adopted with good results the use of horizontal and perpendicular bars. These, placed in different positions, indicated the different teeth and the characteristics of the teeth.

Dr. Ottofy, of Illinois, introduced a resolution, which was adopted, requesting the committee having in charge the Dental Congress to be held at Chicago in 1893 to ask the dentists of the world to submit schemes of dental notation, to the end that some one system may be selected for general use after that date.

Dr. Ottofy further suggested that Dr. Patrick should be given all possible aid in the examination of prehistoric crania by the members of the society. Dr. Noble volunteered to take charge of the work at the national capital, and promised to make thorough researches in the museums at Washington.

Section 6 was then passed, and Section 7, the Section of Anatomy, Pathology, and Surgery was next called. Owing to the absence of the chairman, the report was presented by Dr. Rhein, of New York, the secretary. In presenting his report he made an appeal to the members of the profession in convention assembled to encourage, by every effort in their power, the study of oral anatomy in the dental colleges. He thought it hardly creditable that the students of to-day have so slight a knowledge of oral surgery, and he urged that an increased attention should be paid to it in the educational institutions devoted to the teaching of dentistry.

Two papers referred to Section 7 were next presented by Dr. Rhein. The first was by Dr. A. C. Hugenschmidt, of Paris, France, on the "Occasional Origin of True Chronic Alveolar Abscess in Teeth with Living Pulp." In this paper Dr. Hugenschmidt related a history of three cases in which there was a distinct alveolar abscess in two cases, opening outside at the end of the roots, and where he had to destroy the vitality of the pulps by arsenic, and in one case an injection of cocaine before he could extirpate the pulp. He attributes the etiology of the cases to the presence of some trouble which would ordinarily cause pulpitis and in most teeth be followed by strangulation of the pulp at the apex of the root. But in these cases, on account of the large openings at the apices of the roots, the inflammatory proceeding goes on

without necessarily causing death of the pulp. One of the features of these cases was the lack of pain, which ordinarily accompanies true alveolar abscess. The third case was where, in a superior molar in which the pulp had been extirpated from the palatal and anterior buccal root, pus was found at the extremity of the posterior root, although the pulp was found in a living condition.

Dr. M. L. Rhein read a paper upon the amputation of roots as a radical cure in chronic alveolar abscess: in pyorrhœa alveolaris complicated by alveolar abscess. Among other things he said,—

“The removal of a portion or the whole of the root of a tooth has long been advocated by a few men of our profession as a means of restoration to health of that class of teeth which do not yield to milder medical treatment.

“Like many other operations in oral surgery which naturally come within our sphere of practice, it seems to have received little or no attention from those who have made our literature, and text-books are singularly silent concerning this important method of procedure.

“In the majority of cases the operation is one presenting little difficulty. There are no dangerous anatomical points to be avoided except when working under the antrum of Highmore or in the region of the mental foramen.

“The instruments required are a sharp, spear-shaped drill, with which a hole is drilled through the process passing through the root on a line with the canal. This is followed by a new fissure-drill, but which, worked laterally in both directions, readily severs the end of the root.

“Usually no anæsthetic is required. We must, however, occasionally resort to one where the operation is of considerable length and very painful. Under such circumstances a physician should be summoned who will administer an anæsthetic, leaving the dentist undisturbed in his surgical interference.

“It is well known that the longer an alveolar abscess exists the greater the damage to the surrounding tissue. The injury that the general system receives from the absorption of a certain amount of pus must not be ignored.

“About the apices of the root is found an ever-enlarging zone of diseased tissue. This can well be called the apical space, and acts as the hot-bed for the formation of pus, ichorous or not, as the case may be. The accustomed effect of this is to denude the apex of all circulatory supply, and in time to bring about a necrotic condition of the root which gradually extends towards the crown of the

tooth until, eventually, the entire root becomes necrosed. Treatment through the canal of the root for the cure of this disease is useless after necrosis has once attacked the apex. The operation of entering through the gum and burring the diseased tissue is uncertain in its results. Having filled the root or roots, the diseased portion is excised. This is at once followed by the vigorous use of the bur in the surrounding pathological tissue, and an immediate and radical cure is the result.

"All that is requisite is to see that the operation has been performed under true aseptic conditions and that the parts are kept so until the wound has entirely healed.

"One of the worst conditions that we meet with in the various aspects of pyorrhœa alveolaris is where, through the ravages of the disease, death of the pulp has ensued and there is added to the original septic matter the pus from the broken-down pulp. This condition generally takes place without any warning to the patient; in fact, it is impossible to learn at what time the death of the pulp takes place.

"The powerful nature of the double septic condition soon causes absorption of the end of the root to progress more or less rapidly, so that the purulent matter finds a free escape from the root and passes out through the channel furnished by the pyorrhœa pocket.

"Consequently the diagnosis of such a pulpless tooth becomes a very difficult matter. The color remains good; even the electric mouth-lamp generally fails to indicate that the pulp is dead, because the canal is filled with purulent matter of such a watery consistency that it is rendered as translucent as though traversed by a living pulp. The only reliable diagnostic sign is to isolate the tooth by means of the rubber dam, and applying intense cold or heat. The smallest amount of the spray of chloride of methyl is admirably adapted for this purpose. We have all experienced the hopelessness of treatment of such teeth, and a course of procedure which will enable us to preserve them for useful service may perchance be welcomed by the profession."

Dr. Rhein cited five cases, admirably arranged, to bring out the points presented in the paper. Two of the most interesting cases are here presented.

Mr. H., aged about thirty, presented himself in 1882 to have his mouth put in good order. A very long and firmly-embedded root was all that remained of the right superior cuspid. As far as could be ascertained the crown had been broken off for some years and

at intervals the root had given rise to considerable pain. There was no evidence of any abscess.

Having thoroughly cleansed the canal, the apex was found to be open and the root slightly absorbed around the edges. A forty-per-cent. solution of chloride of zinc was pumped through the apex, which was then sealed with chlora-percha one-third of the length of the root, and the remaining portion was filled with oxy-phosphate of zinc.

Ten days later the patient returned suffering severely from all of the symptoms of alveolar abscess except the swelling. The external parts appeared about normal, and it seemed impossible to bring about resolution. The temperature of the patient was now above 100° F., and a diagnosis was made of the blind abscess with evidences of slight septicæmia. The patient was at once put on a tonic and antipyretic treatment, and it was determined to amputate the end of the root.

Chloroform having been administered, an incision was made in the gum over the apex of the root, and a piece of tissue about three-eighths of an inch was removed. A spear-shaped drill was then passed through the process, and with a new fissure-bur one-eighth of an inch of the apex was severed from the rest of the root. It was with great difficulty that this was removed, and not until a considerable portion of the alveolus had been drilled away; attached to the root was a sac about half an inch long. The entire space was then thoroughly burred. It was washed out with a carbolized solution and allowed to heal under iodoform dressing. Had we had our present knowledge of the various germicides, carbolic acid would have been discarded for something more efficacious. A crown was subsequently attached to the root and is doing good service to-day.

Mr. T., aged about fifty-three, of vigorous and healthy constitution. He had always taken fair care of his teeth, none of which had been lost. The deposit of salivary calculus had always been dense and rapid in its formation, necessitating very frequent attention to the removal of the same. Having somewhat neglected his mouth, he presented himself in 1889 for treatment. There was an extensive deposit of salivary calculus, on removing which it became evident that the former work of removing the same had been very superficial. There was considerable tumefaction of the gum and a discharge of pus. Local treatment restored his mouth very speedily to a condition of health with the exception of the superior left first molar.

The palatine root of this tooth was entirely denuded of any covering on its palatal aspect down to the very point of the apex, its nerve-connection having long since been severed. No filling had ever been inserted in the tooth and there was no sign of caries. The rubber dam having been adjusted, a hole was drilled through the centre of the crown and the pulp, which was found to be in a putrescent state, thoroughly removed from the three roots. They were then cleansed and filled as previously described, and a permanent filling inserted over the oxyphosphate to close the opening in the crown.

A fine fissure-bur was then passed through the palatine root close to the crown, and the entire root removed. At the point of amputation another permanent filling was inserted.

Two weeks later the gum on the palatal side was in a healthy condition, all traces of the imprint of the root had disappeared, and the tooth, which had been very loose, was now firm in its socket, supported by the two buccal roots.

This is the most common class of teeth that we meet in which the amputation of the roots is indicated. Not only do we restore to usefulness a loose tooth, but we stop the absorption of a certain amount of purulent matter.

To briefly summarize: Wherever death of any portion of a root has taken place, the simplest cure is to amputate the necrosed portion of the root and the tissue will close firmly about the remaining healthy portion.

(To be continued.)

NEW JERSEY STATE DENTAL SOCIETY.—TWENTIETH ANNUAL SESSION.

(Continued from vol. xi., page 782.)

Dr. Welch.—So much has been stated in the paper and in the discussion which followed it that it does not leave much room for anything further to be said on the subject. The conclusion of the essayist has been that we are evidently coming to a state of thoughtfulness in the profession and not mere practice; and it is a very good feature. We all of us have good thoughts, but only a few of us use them. We all have some genius, but there are so few of us

who know how to take the thoughts of genius as they pass. Therefore there are only a few successful dentists in the highest sense of that term. There are a great many who are mere mechanics and do things because they have learned to so do them, and because they have been taught by others; while there are others who are thoughtful and progressive.

So it is in public education. Very much more good could be done than is done to educate the public if dentists would impart to their patients the knowledge which would be of benefit to them while under their control. Our mouths are usually shut to such things while we work away with our instruments and show ourselves simply as mechanics. A mere word passed by a dentist to a patient in the proper way and at the proper time often sows the seeds of thought for a whole lifetime, and sometimes for the lives of the children afterwards. While we should all strive to be skilful operators, we should also seek to be popular educators; and while we are skilful with our fingers, there should also be an activity of thought and promptness in using opportunities. In this way we command a position that is desirable. It will be our own fault if we do not do so.

Professor C. N. Peirce.—I have just learned that the original paper on this subject, which I did not have the pleasure of hearing, was rather suggestive of the education of the public as aiding in skilful operation. Am I correct?

The President.—Yes, sir; you are.

Professor Peirce.—I would like to say a word or two on the subject. I think that very much can be done for our patients by the appropriate use of a few words at the proper time. An instance occurred of that kind in my own practice. A lady brought a child of about fourteen years of age to me for examination. After examining the mouth I said to the mother that the child was not in the habit of using her teeth, but that the food was washed into the stomach without proper mastication. I came to that conclusion from the appearance of the teeth and gums. I said, "I presume your child does not spend more than ten or fifteen minutes at her meals at a time." She replied, "That is the truth; she washes everything into her stomach with milk and water." I told the mother it would be folly for me to attempt to treat the child's teeth until some change was made in her habits of life, and that if she would take her home and deprive her of any liquid during meal-time for three months, I was satisfied the teeth would not suffer during that time, and that then I would do what I could to save

them. The mother was conscientious in the treatment. She took the child home, and assured me that during the period I mentioned and until she came to me again she took her meals without the use of liquids, the liquid being taken before and after meals. I could not tell you of the improvement in that mouth during those three months,—in the cleanliness and appearance of the teeth. All but the inferior incisor teeth needed filling, and by insisting that the child should eat her food as dry as possible the teeth were kept well; but I am satisfied that had not the instructions been given the fillings would not have saved them, and that by the time she was twenty-one or twenty-two she would have been almost toothless with the exception of the inferior incisors. I base my judgment entirely upon what I believe is true, and that is, that use always aids in health and development. Disuse is a predisposing cause of decay in the teeth. In my practice I have always advised my patients, where they had teeth decaying rapidly, to eat their food as dry as possible, to masticate it thoroughly, and to give the teeth as much use as they could, and that little advice to my patients has been of great assistance to me and of very great advantage to the patients themselves.

Dr. J. A. Osmun.—In closing the discussion I have not anything to add. The discussion has simply carried out my ideas in a better way than I did. The idea I had in speaking of the higher education of dentists in manual training was to illustrate the fact that many men have good memories and can answer many questions on an examination and yet know very little indeed concerning the subject. In my experience I have had to do with the graduates of three or four different colleges, who actually knew nothing at all about the practical work they were called upon to perform,—the execution was entirely at fault. That is the reason I took the position I did on that point. I have no desire to lower in any way the standard of theory; raise it as high as you will,—the higher the better. Still, I do not think that is enough; we should have plenty of manual dexterity as well.

My plan for the education of the masses has been touched upon very ably by the gentlemen who participated in the discussion. I claim I am right in that. There is the utmost ignorance in the vast majority of the people at large, and the only ones who have been educated at all in dental matters are the patients of those who have been self-sacrificing enough to take some time to explain to them the different operations. We constantly meet people who are intelligent in every other direction, but woefully ignorant con-

cerning the care of their own mouths. It is not an uncommon experience for people to come in and say, "I would like to have this child's tooth extracted." On examination the tooth is found to be a permanent one, but your visitor will argue with you, saying the child had never had a tooth taken out there, and insist that it is a first tooth. These are not ignorant people in general matters, and the only reason they lack knowledge in this direction is because nothing is ever seen in the daily papers in the way of teaching the general public upon this subject. That is the reason why I called upon the dental editors and secretaries of dental societies to disseminate these matters. We ought to give them out, but we keep them to ourselves. We have meetings where papers are read full of pregnant thoughts useful to the public. We have a duty to perform in educating the people as well as in educating ourselves, and when we fail to do it we are not living up to the highest standard.

The endowment of dental colleges, that has been spoken of, is one that lies very near my heart. I hope to see fewer colleges, and those so well supplied with means that they can be—like Cæsar's wife—above suspicion.

In reference to physicians and our relations with them, I read a paper, I think, before this society on that very subject. Physicians do not know all about dentistry any more than we do about medicine. I am happy to say that in my own city the physicians are very courteous and kind in sending patients who have any trouble in the oral cavity to the dentist, to see what their difficulty is.

I am very thankful to the gentlemen who followed me for their very courteous treatment of my paper, and to the other members of this society for the very kind way in which they received it.

On motion, the paper was passed.

On motion, the three applications for membership were referred to the Board of Examiners.

Wednesday, July 16, 1890.—Evening Session.

Secretary called the roll.

Committee on President's Address reported progress.

The following persons were proposed for membership: Edward B. Frost, D.D.S., of Elizabeth, N. J.; Henry Pfheiffer, D.D.S., of Newark, N. J.; William L. Fish, D.D.S., of Roseville, N. J.

The Examining Board reported favorably upon the applications for membership of A. S. Kniffen, D.D.S., of Trenton, N. J.; D. W.

Kleinhaus, D.D.S., of Newark, N. J.; B. F. Tillyer, D.D.S., Dover, N. J.; and R. H. Sheppard, D.D.S., of Phillipsburg, N. J.

Dr. William H. Trueman then read a paper on "Erosion."
(For Dr. Trueman's paper, see page 86.)

DISCUSSION.

Professor James Truman.—The subject of this paper, it seems to me, is so largely suggestive rather than demonstrative of any particular course of procedure that I am left in the position of being forced to define what I regard as erosion and abrasion as preliminary to the consideration of the general subject.

I take the position that erosion and abrasion are extremely simple things, governed by a certain law of chemical action, and that there is really but trifling difference between the two conditions. Abrasion is caused, necessarily and primarily, by attrition with antagonizing teeth and aided, possibly, in all cases by acid action. Erosion is the result, unquestionably, of chemical solution and the added effect of wear of lips and particles of food. It is impossible, in my opinion, to separate these two conditions.

It is true that abrasion may occur through long attrition in mastication, and that the acid action is so insidious that it is, ordinarily, not considered as a factor in the destruction. It is, therefore, fair to conclude that we have two processes at work,—one, the wearing away by attrition, and the other softening the dental structure by acids.

When erosion proper is considered, the labial and buccal surfaces, usually of the superior teeth, are found to be destroyed and presenting peculiar manifestations of destructive action. The result is, however, not markedly different from that which occurs on the masticating surface through abrasion, and I cannot possibly draw a line between these two pathological processes.

Teeth thus acted upon are extremely dense teeth. It does not happen in early childhood, but is observed after the individual has reached a period of maturity and the teeth have become very dense.

The process which operates to produce caries on the labial surfaces of the superior incisor teeth in a child is the same in kind modified by age and conditions. In a child of eight to fifteen it rapidly progresses to so-called "white decay," as the influences, at this period, are on an entirely different structure incapable of similar manifestations to that of teeth at fifty.

Caries and erosion must be broadly distinguished from each

other, as they have only a moderate degree of similarity. Erosion is a chemical action upon the tooth-structure, while caries, although produced by chemical solution, has other factors entering into combination to produce destructive results. The fact that a slight irritation, as the wearing down of the anterior teeth, produces an extra development of tissue is well known to every one present. This led me long ago to formulate this in this way,—that slight irritation produced increased development of tissue, and that over excitation produced destruction.

I now come to the consideration of the practical points of this paper of Dr. William Trueman, in which I think he has scarcely done me justice. It is one thing to furnish a clue to the solution of a vexed problem, and quite another thing to make subsequent investigations from the foundation laid. The question of erosion is one that has interested me for a series of years, as it was one of the problems for which no explanation had been given.

From a long series of tests and examinations, I had found that the secretions of the mouth during the daytime generally gave a neutral response. From that result I came to the conclusion that this question to be solved required more extended examination and in different directions. Recognizing the fact that the secretions giving a neutral response were in a condition to rapidly change to acid under proper surroundings, the effort was made to discover when and where this was likely to occur. The fact that secretions in localities where but slight motion of fluids were present generally presented a slight acid reaction led to the hypothesis that possibly the fluids of the mouth at night might be found to be increasingly acid. The difficulty of making any extended investigations here was apparent; but the work was begun on my own person. The oral secretions were carefully tested during the day without result. A further test immediately on awakening gave a marked acid reaction. This was so clear and positive that it naturally pointed to the cause of erosion. This was followed by other tests in mouths affected by erosion and in young mouths with affected labial surfaces, until the evidence accumulated and was of such a pronounced character that I did not pretend to doubt that the largest amount of destruction of teeth through caries and erosion occurred at night. From these initial observations others took up the subject, and my class of students aided me materially by corroborative results. Since that period a few others have become interested, and have, as in the case of my friend Dr. Kirk, carried the solution of the problem a step farther.

I wish to say here that these facts, narrated in substance at the discussion of Dr. Darby's paper on erosion, read before the Odontological Society of Pennsylvania, were not given by way of suggestion, but as facts demonstrated. Dr. Kirk was present at that meeting, and it was through this statement that he was led to make his admirable investigations and produce the satisfactory results. His conclusions, however, were all based on the facts I presented in regard to periods of rest and subsequent fermentation. While I am speaking I have no doubt but that there is a change going on in my own mouth, and that the secretions would exhibit a more or less acid reaction were they tested. The dryness of the mouth indicates a cessation of the flow of saliva, and its absence increases acidity. During the night this condition is generally maintained for hours. The lips are held in close contact with the labial surfaces of the anterior teeth, and there must be a chemical solution constantly transpiring.

What is true of these teeth is equally and increasingly true of all cavities of decay and of all confined places. Now, all this is very simple to my mind, and I should have been pleased if my friend, Dr. William Trueman, had given the subject, as far as the origin of this hypothesis is concerned, a clearer statement. I do not wish to stand on this question in the light of a doubter. I have no question as to the main facts. I have been obliged to speak of my personal connection with this, as it is important for the elucidation of the subject, though unpleasant in other respects.

Investigation in this matter, in my opinion, has two prominent features about it, one is the chemical and the other the clinical. This division may and probably does cover most of the investigations we, as dentists, are called upon to perform. These two modes may be regarded as the positive and the negative of all these forms of examination, and the policy of using one without the other is not to be commended, yet it is in the knowledge of every one that clinical experience has solved many problems in advance of chemical demonstration.

The essayist stated in the paper that fillings placed in cavities caused by erosion were of no avail, or, in his own language, he could not see how they could preserve a tooth under such conditions. It certainly would be impossible; but it is rare indeed that a filling can be placed in such teeth without a great sacrifice of tooth-tissue, and then conditions must be entirely changed to expect ultimate success.

Serious objections have been made to the chemical theory stated

on account of the high polish presented in all cases of erosion. Those of you who remember the old narrow clasp in use many years ago,—half-round wire,—will recall the fact that this clasp wore into the tooth, and the dentine became very dense and highly polished. This condition of the surface was, without doubt, caused by the constant movement of the clasp and the passage of fluids back and forth. The destruction of tissue was caused by the retention of the secretions against the tooth, eventually causing the slow but certain solution of tooth-material.

The statement of the essayist, in his final conclusion in regard to erosion, is that acid action is simply a tradition. It is more than a tradition, as it took its place along with the chemico-vital theory of a past generation. At present it has passed beyond speculation and has reached the positiveness of a demonstration, and I cannot understand why other explanations of this process are given in view of my original and the subsequent work of Dr. Kirk.

At the time when I suppose Dr. Trueman was preparing this paper presented to you to-day, he sent me a patient with the request that I would give an opinion and suggest a remedy for the superior incisor teeth, very extensively eroded. I examined the teeth of the young man, and informed him, as I have you, that the trouble was the result of acid action during the night. I tested his oral secretions and found, as I anticipated, a neutral response. His reply to my conclusions was not complimentary, and asserted his lack of faith in any such theory. He finally, however, consented to follow my instructions in regard to testing with litmus paper.

In a few days I received a letter from him acknowledging his error, and stating that he had tested the oral secretions early in the morning, and enclosed me the paper as evidence that my diagnosis was correct. I have these slips and will now show the decided evidence of acid action.

Now, a word as to treatment. That, necessarily, must be very simple, an antacid being all that is required in connection with constant care as to cleanliness. This very simplicity causes some to reject it. If I am correct in my conclusions, an agent must be sought for that will neutralize acidity for the period named during sleep, and there is nothing better in my opinion than one of the forms of prepared chalk. The advantage of this is that it will remain on the teeth longer than other agents if applied in a thick magma. This course I have invariably adopted in young children, where there is a tendency to destruction of labial surfaces through

green stain or direct action of acid and with most satisfactory results. There is sometimes a tendency to gastric disturbance if too long continued; but this is readily recognized and the treatment intermitted. The same course must be followed in erosion in both cases, remembering that mere day treatment will be of no value, but that the teeth must be carefully attended to during the twenty-four hours if good results are to be secured.

I have a case now under care, the most serious presentation of erosion it has been my privilege to examine, as it involves all the anterior teeth to fully half their depth in an antero-posterior direction. I saw the case some six years ago for the first time. Filling was out of the question, so I placed him under the treatment described, and he has faithfully followed it without, as far as I can observe, any further loss of tooth-tissue.

To my mind the evidence is sufficient, and we must look for the cause of erosion in the change of the secretions of the mouth, that it is altogether chemical, and the high polish is the result of the combined action of the lips, the passing of fluid and particles of food.

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

THE Twenty-second Annual Meeting of the Pennsylvania State Dental Society met in the Minnequa House, Minnequa Springs, Bradford Co., Pa., on Tuesday, July 29, 1890.

President J. C. M. Hamilton in the chair, who called the meeting to order at 10.30 A.M. The morning was devoted to routine business.

The afternoon session was opened by the annual address of the president, Dr. Hamilton, who called attention to the importance of improving the moral tone of students, and if found deficient in the moral sense they should be dropped from the rolls.

He laid special stress upon a "Scientific Knowledge of Man's Origin." The law of heredity was explained and the necessity of close attention to its requirements was considered at length.

He alluded to anomalies in teeth and the fact that the American teeth are poorer does not warrant the wholesale removal as witnessed.

He urged the Society to make an effort to arouse an interest in their meetings and to endeavor to induce a large attendance.

After some commendatory remarks on President Hamilton's address, Dr. Alonzo P. Beale, of Philadelphia, read a paper on "Inter-Dental Splints."

(For Dr. Beale's paper, see page 81.)

The subject was illustrated by a number of colored drawings which were frequently referred to by the essayist.

After the reading of Dr. Beale's paper the president announced the subject open for discussion.

Dr. H. Leffman thought the paper demonstrated the necessity of physicians being more familiar with the different methods spoken of in the paper.

Dr. Beck, who has had much experience in this kind of work from practising in a mining region, spoke of special cases which had come under his observation necessitating the use of bands and wires, it being impossible to take impressions as Dr. Beale suggested, and, while not perfect when healed, the patients so treated all presented a very respectable appearance. He was well pleased with the paper, and would take advantage of the suggestions offered at the first opportunity which should present itself.

Dr. Roberts thought Dr. Beale had so thoroughly covered the subject that it left nothing for him to suggest.

Dr. W. H. Fundenberg has had considerable experience with maxillary fractures, but as the cases always come from physicians several days after the accident, much valuable time has necessarily been lost. He spoke of a case in the person of a little girl where the extent of the fracture was so great that no impression of the teeth could be obtained. An impression of the chin was taken, corresponding to which a cap splint was made, which was held in position until the parts were united.

Dr. Hamilton had a case the treatment of which, he said, was somewhat crude though effectual. The anterior portion of the maxilla had been smashed in. Treatment consisted simply in saturating a sponge with plaster of Paris, placing it in the mouth, which being closed upon, it was held in position by means of bandages for eight days, at the end of which time this improvised splint was renewed. Four weeks of this treatment resulted in a very satisfactory healing of the parts.

Dr. Boice thought that ingenuity and simplicity entered largely into the successful treatment of fractures. He never had any success with the correct articulation method Dr. Beale speaks of.

Dr. Beale explained that as the splints are stationary the measurements are intended mostly to approximate the position of the splints; that ligatures were very good for certain cases, but that splints restored more perfectly the articulation. He called especial attention to the covering of the casts with tin-foil for reasons given in the paper.

Dr. J. C. Green thought the society should feel very grateful to Dr. Beale for his excellent paper and especially thankful for the advantages we possess to-day over the time thirty years ago when we had no such material as vulcanizable rubber from which to make inter-dental splints.

Dr. Klump has made a number of splints on the principle suggested by the essayist, and they have given uniform satisfaction.

Subject passed.

(To be continued.)

SWISS ODONTOLOGICAL SOCIETY.

THE Fifth Annual Meeting of the Swiss Odontological Society was held at Geneva, October 4, 5, and 6, 1890.

The meeting taking place unusually late in the season, not as many dentists were present as might have been; yet there were over fifty. The president of the Society, Professor Dr. Redard (Geneva), delivered a short address, after which Dr. Magitot, the well-known French writer, read a paper on "Mutilations Ethniques," in which he spoke of the peculiar manner in which some of the non-civilized peoples mutilate their teeth, by cutting them into certain very strange shapes, giving, for instance, to all incisors the form of cuspids. The paper was listened to with great interest, yet no discussion followed, as it was of little scientific or practical value.

The second paper was read by Dr. Oltramore, of Buenos Ayres. He described his new method of making fillings of cement and gold. He prepares beforehand a piece of gold of the size and approximate shape of the opening of the cavity, by condensing a few cohesive cylinders on a serrated steel plate. He then fills two-thirds of the cavity with an oxyphosphate cement, places his prepared piece of gold on the cement while it is yet soft, and finishes the filling by putting on more cohesive gold, until the desired fullness is arrived at. Dr. Oltramore claims to have good results with

these fillings and to save a great deal of labor. Time will test this method.

The third paper was read by Dr. Theo. Frick, of Zurich, "On the Treatment of Approximal Cavities in Molars and Bicuspids." The essayist had examined mouths of patients of over forty different dentists, and finds that thousands of "flat fillings" are still being made, which fail entirely to save teeth for any considerable length of time. The principal aim of his paper is, therefore, to prove that contour fillings are the only ones that will save teeth permanently. After stating that the only direct cause of caries is decomposition of food lying between the teeth, he shows how a filling must be shaped in order to prevent the food from lodging in its surroundings, and to give at the same time an uninterrupted surface for mastication. In the second part of the paper the writer describes the different steps and manipulations in making approximal fillings, calling particular attention to the separation of teeth, not with the file, but by pressure; to get a direct channel of approach to the deeper parts of the cavity; to use a thin matrix; to finish fillings by working from the labial and lingual side (with Meriam's files and other instruments). In filling difficult cavities the essayist finds great satisfaction in using a hard, dry amalgam for the cervical portion, and finishing with cohesive gold at the same sitting. He denounces the use of cements as a would-be permanent material for approximal fillings. In concluding, he hopes that more and more members of the profession will become "contourists."

Next day, Sunday, October 5, a business meeting was held, in which Dr. T. Billeter, professor of dental pathology and therapeutics at the University of Zurich, was elected president of the Society. It was also decided that, in the near future, a quarterly dental journal should be published as the official organ of the Swiss Odontological Society. The afternoon was devoted to social gatherings.

Monday was the day for clinics.

Professor Dr. Redard (Geneva) extracted teeth, producing local anæsthesia by applying ethyl chloride (C_2H_5Cl) as a spray on the cheek and on the mucous membrane around the tooth to be extracted.

Dr. Witzig (Bâle) demonstrated several new inventions of Dr. Herbst, of Bremen (whom he had visited a few weeks before). He called attention to his new method of making glass fillings and his method of producing an amalgam filling of good color and edge-strength, by combining it with pure silver-foil when mixing with mercury.

Dr. Oltramore (Buenos Ayres) filled several teeth (out of the mouth) by the method described in his paper.

Dr. Reverdin (Geneva) showed several new instruments, invented by him,—a very practical mouth-opener; an instrument for drawing jaw and tongue forward during narcosis with chloroform or ether; a special needle and holder for manoplastic operations.

Dr. Emery (Geneva) exhibited an instrument for extracting lower molars, which combines the advantages of the forceps and the old-fashioned key.

Dr. Kummer (Geneva) presented several patients, on whom operations like resection of the upper maxillary bone had been performed. The question how to replace the lost part artificially was discussed.

Dr. Roussy (Geneva) showed his apparatus, after Paul Bert, to give nitrous oxide gas in combination with compressed air.

Dr. Préterre (Paris) exhibited his fine collection of abnormally-shaped teeth, supernumeraries, etc., and several beautifully-made obturators.

Several other demonstrations and short communications were made. The meeting was altogether very interesting. It was decided that the next meeting should be held at Berne in the month of May, 1891.

THEO. FRICK, D.D.S.

ZURICH, SWITZERLAND.

Editorial.

THE TARIFF ON MANUFACTURED TEETH.

WHEN the so-called McKinley bill was passed by both houses of Congress and signed by the President, it is questionable whether the dental profession at large had any idea that it touched their interests, only as it indirectly affected the great mass of the people. It was therefore doubtless with surprise that they discovered that they were to be subjected to the unpleasant effect of a prohibitory clause, which must appear to any reflecting mind as being wholly unnecessary and one in direct opposition to the best interests of operators and patients.

On examination of the official "Comparison of the Custom Laws of 1883 with the New Law of 1890," it is found, under the heading "Schedule N., Sundries," that "Items specially provided for under the old law, which will be classified under the new law according to the component material of chief value," there is given, among other articles, "Teeth manufactured, twenty per cent. *ad valorem*" (old law). As porcelain is the "component part" of teeth, an examination of "Schedule B" gives us the new law. "China, porcelain, parian, etc., . . . not specially provided for in this act, . . . if not ornamented or decorated, *fifty-five per centum ad valorem*."

It is not the purpose of this journal to question the policy of protection in any sense, as that would be beyond its province; but when a blow is aimed directly, as this does, at an important part of our profession,—mechanical dentistry,—it is certainly not only our duty, but that of every individual connected with our calling, to protest, and ask for its repeal. The twenty per cent. *ad valorem* was ample protection to the manufacturing interests engaged in this specialty, if protection were needed at all.

The production of artificial teeth has been, from the earliest periods of the manufacture, almost exclusively confined to the United States. The product has occupied, very justly, a pre-eminent place in the work of the world, and has never stood in danger of competition. In no country of Europe has there ever been an approach to the results obtained here, and only in one case has any manufacturing establishment on the other side of the

ocean been able to compete in Europe with those specially engaged in this work in the United States. This exhibit is a remarkable one in view of the extraordinary development of porcelain manufacture in other lines in Europe.

The few engaged in this manufacture in this country have grown wealthy, as they practically enjoyed for many years the monopoly of the markets of the world, and, as far as this country is concerned, the importation of foreign manufactured teeth has been in the past of insignificant proportions.

A demand has, however, grown up in recent years for the product of an English manufacturer, for the reason that these teeth possessed some advantages for certain kinds of dentures, especially that of "bridge-work." This demand evidently began to assume disagreeable proportions, or no one would have heard of an increase of duty.

The situation is now such that it will be impossible to procure these teeth without great difficulty and serious additional expense. The latter is not of so much moment as the fact that they will probably not be obtainable here at any price.

Now, it may be asked, why this increase of duty? Is the industry one that requires protection? Have the gentlemen who have been engaged in this manufacture for the past half-century not realized an equivalent for the capital invested? Have they at any time been in competition with the cheap labor of Europe? These questions, and more, require answers from those financially interested. We have no information to lead to the supposition that undue influence has been used to secure this additional charge; but it is singular that the Committee of Congress should have decided to increase the duty thirty-five per cent. without solicitation or knowledge. It would be interesting to know the reasons for this great increase.

As a profession, we have nothing to do with the political aspects of this question; but it does seem as though active efforts should be made to secure the repeal of this obnoxious clause, for which not a shadow of reason exists.

DR. (?) HUNTER'S DENTAL ANODYNE.

UNDER "Current News" will be found a copy of a portion of "Specifications forming part of Letters Patent No. 394,693, dated December 18, 1888."

The dangerous character of this concoction requires that it

should be exposed promptly. It is only necessary, we hope, to call attention to the facts connected with it to stamp its character. The arsenious acid contained in this preparation is sufficient to kill ten individuals, and that it is certain to destroy all the pulps to which it may be applied is fully understood.

The circular accompanying this remarkable production, after giving an account of its wonderful and "potent ingredients," says: "I have sold one-third interest in my patent right to a Norfolk gentleman, and am now manufacturing my preparation at No. 46 Cumberland Street, Norfolk, Va." He kindly says, "Mothers should not be without it, as they can stop the little ones' teeth from aching in a few minutes."

It is scarcely credible, in view of these facts, that any one should be willing to endorse this compound, yet we are informed that a very prominent dentist of New York City has recommended it. And the inventor (?) says, "I demonstrated my preparation in the Dental College of Philadelphia to the entire satisfaction of professors and students, and they pronounce it a wonderful thing." This, it is hoped, may be proved an incorrect statement.

It is high time the dental profession had put the stamp of ignominy upon all secret and proprietary preparations of whatever kind.

TO CONTRIBUTORS.

It has been decided to change the date of issue of this journal from the 15th of each month to the 1st. It will, therefore, be necessary to have all contributions placed in the hands of the editor not later than the 10th of the month.

BIBLIOGRAPHY.

DENTAL SURGERY: INCLUDING SPECIAL ANATOMY AND PATHOLOGY.

By HENRY SEWILL, M.R.C.S., L.D.S. (Eng.). Third Edition, with 206 Illustrations. P. Blakiston, Son & Co., Philadelphia, 1890.

This well-known work of Dr. Sewill, now in its third edition, has many points of great value. It is a gratification, on opening a book, to be met at once with illustrations that exactly define the text. It is rare to meet anything better in this direction

than is presented on page 11. Dentine is here represented as faithfully as it could be seen under the microscope. The same can be said of the chapter on "Development of Teeth," where the illustrations, taken directly from the specimens, leave no room for questioning or criticism. The old mode of drawings and woodcuts invariably bring in the personal equation and are necessarily subject to doubt and misapprehension.

These remarks apply with particular force to the exceedingly interesting and instructive chapter on "Caries." The fac-simile reproduction of photo-micrographs are here very fine, illustrating the action of micro-organisms in dentine, and confirm the recent observations of Miller, and the previous ones of Underwood and Milles. The whole chapter bears evidence of personal research and thorough work. The author gives credit to Professor Miller for having produced artificial caries; but evidently regards Underwood and Milles as the ones entitled to the largest consideration in connection with this subject. American readers, while willing to give due credit to the gentlemen named, cannot feel that they made a marked advance over the earlier work of Leber and Rottenstein.

The following quotation is hard to comprehend:

"Gallippe and Hoppe-Seyler, both have made some observations going to show that teeth (enamel and dentine) increase in density as age advances; but these observations are incomplete and fallacious, and it would be unsafe to base conclusions upon them. Since individual teeth of a set in the vast majority of cases vary considerably in structural character, it would be necessary in order to prove alteration in density to cut sections from the same tooth at different periods of its existence."

If the author means to be understood that there is no change in enamel, and especially in dentine, as age advances, he places himself in opposition to recognized clinical facts. If there is one thing settled, it is that function causes physiological action, and that dentine, at least, becomes, by increase of density, more resistant to caries as age advances. The operators in this country depend on this fact to enable them to keep the soft teeth until at a later age they can be filled with better material than ordinary plastics.

While on the subject of caries the author takes occasion to say, "That in face of all the facts and considerations, an American writer within late years has elaborately described what he styles inflammation of enamel and inflammation of dentine. . . . The publication of a statement of this kind seems hardly compatible with possession of an adequate knowledge of microscopical and bacteriological science."

The portion devoted to devitalization of pulp is open to criticism. It is surprising that an operator of the skill of the author should recommend wax as a cover-stopping for arsenic. It is wholly unreliable as a stopping in the most careful hands, and in those of students it is almost certain to result in failure, if not serious injury to surrounding parts.

It is further a matter of surprise that the author does not allude to the resistance offered by pulps, in a state of inflammation, to the action of arsenious acid. The treatment of this class of pathological presentations has been so much advanced in the past few years, and is so important, that the omission is a serious mistake.

In the treatment of pericementitis there is a very proper allusion to the necessity of care to render the canals aseptic; but that on the counter-irritation method, as applied to the gum, is of a routine character. It is about time some attention should be paid to the reasons why aconite and iodine should or should not be used. The topical action of aconite is, in the writer's estimation, if not injurious, at least of very little value. The effect of this agent is to paralyze the peripheral sensory nerves, and must, therefore, necessarily lessen the circulation at the part where an increase of the flow of blood is most to be desired.

The paragraphs devoted to erosion are equally defective, in view of the light thrown on this subject of recent years.

As a manual this work can be most heartily recommended. It has serious faults of omission, but these do not materially detract from its general value.

DESCRIPTIVE ANATOMY OF THE HUMAN TEETH. By G. V. BLACK, M.D., D.D.S. Published by the Wilmington Dental Manufacturing Company, Philadelphia, 1890.

Dr. Black has shown in this volume, as he has in former productions of his pen, a very satisfactory attention to detail and correct description.

In the preface he says, "By my experience as a practitioner, as a teacher, and in my intercourse with fellow-practitioners, I have become convinced of a serious defect in the teaching of the details of the anatomy of the teeth and in the systematization of the terms used in their description." He further says, in the same preface, "The absence of a bibliography may be noted. The plan and object of this work has not seemed to call for many references to authorities. This does not imply, however, that authors who have preceded me, . . . to whom we are greatly indebted, have

been either overlooked or ignored." This must be regarded as a serious defect in this and previous productions of this writer. It is a bad system and one that eventually robs the originator of an idea of all credit for work that may have cost him serious toil in investigation to bring out results. There could be no better plan devised than this to completely bury an original worker, and we are surprised that Dr. Black should persistently set an example that may react on his labors in the future.

The book itself will be invaluable to those who desire the anatomy of the human teeth in the minutest detail, both in the deciduous and the permanent series.

The part devoted to the consideration of "pulp-chambers" is novel in some of its illustrated features, in that it gives exact reproductions of these in silhouettes. His plan is original, and worthy of special notice. "After the pulp-chamber is exposed so that half of its concavity remains in the half of the tooth and has been ground smooth and flat, it should be inked on an ink-pad (such as is used for rubber stamps for printing) and a print made from it. This will give the form of the tooth and pulp-chamber."

This book can be most cordially recommended to the student and teacher as the clearest and most exact of any of the publications on the anatomy of the human teeth.

A COMPEND OF CHEMISTRY, INORGANIC AND ORGANIC, INCLUDING URINARY ANALYSIS. By HENRY LEFFMAN, M.D., D.D.S., Professor of Chemistry in the Woman's Medical College of Pennsylvania, in the Pennsylvania College of Dental Surgery, and in the Wagner Free Institute of Science; Food Inspector for the Pennsylvania State Board of Agriculture. Third Edition revised. Pp. 193. Cloth, \$1.00. Interleaved, for taking notes, \$1.25. P. Blakiston, Son & Co., 1012 Walnut Street, Philadelphia, 1890.

The experience of Professor Leffman as a teacher is in itself a guarantee of the thorough adaptation of this work to the needs of the student, and the demand for a third edition is sufficient proof of the substantial aid which it affords in following a course of lectures on chemistry. As stated in the preface, "Any one who has had experience in teaching at American medical colleges knows that, as long as the present methods continue, some such assistance is absolutely essential. It affords to the student an opportunity to keep up with the lectures, and obviates the necessity of taking voluminous notes, in which serious errors are liable to occur. Such

books, of course, cannot claim any originality; their merit lies in their accuracy, perspicuity, and judicious selection of facts."

These conditions have been admirably fulfilled in the work under consideration. The selection of facts, while full, is well chosen and compendious, while the perspicuity of their treatment is such as to almost warrant a claim for originality, in this phase of the work at least. While books of this character are not intended in any sense to replace the larger text-books, they will continue to find favor with the student as reliable aids in acquiring a knowledge of the subjects of which they treat. This one is a most satisfactory example of its class.

E. C. K.

A COMPEND OF DENTAL PATHOLOGY AND DENTAL MEDICINE. By GEO. W. WARREN, D.D.S., Clinical Chief of Pennsylvania College of Dental Surgery. Illustrated. P. Blakiston, Son & Co., Philadelphia, 1890.

This class of books is not as a rule to be commended, as it is impossible to condense satisfactorily the subject-matter to the limits desired. In the present instance, the author has endeavored to embrace Dental Pathology into the limits of forty-seven small pages, with unsatisfactory results to each of the subjects treated.

The balance of the book, fifty-nine pages, is devoted to "Dental Medicine." This is more successful, and doubtless will have a value to such as simply desire condensed paragraphs describing the various agents used.

THE LATIN GRAMMAR OF PHARMACY AND MEDICINE. By D. H. ROBINSON, Ph.D. Professor of Latin Language and Literature, University of Kansas, with an Introduction by L. E. Sayre, Ph.G., Professor of Pharmacy, etc. P. Blakiston, Son & Co., Philadelphia, 1890.

It may seem strange to some that a work of this kind should be deemed necessary, and in the countries of the Old World, where professional men are invariably recruited from the scholarly classes, it would doubtless be regarded as a reflection, and in some sense it must so be considered here. A previous knowledge of Latin has not, as yet, been made a prerequisite for admission in all medical and dental schools, hence a large number—happily growing fewer yearly—enter college with no training in this language. They are, necessarily, placed at once in an unfortunate position. It is to meet this class that the author has designed this valuable book. In his preface he gives the reasons for its preparation. "It was

designed expressly to meet the needs of the first year pharmacy and medical students of this institution. Considerable experience in teaching such students had clearly shown that those who had not studied Latin were at a great disadvantage, compared with those who had acquired a fair knowledge of that language."

As far as the writer is aware, no such book has been before attempted. Dr. Thomas, in his medical dictionary (appendix), endeavors to supply this long-felt want; but it has not the merit of a work devoted exclusively to the subject. The author, therefore, in striking out in a new field, has certainly met the necessities of the class for whom it is intended, and which may also prove a valuable book of reference for those more favored.

The arrangement of the book is practical, the student gradually becoming familiar in the exercises with medical and pharmaceutical terms.

ESSENTIALS OF ANATOMY AND MANUAL OF PRACTICAL DISSECTION, ETC. By CHARLES B. NANCREDE, M.D. Third Edition. With 30 pages lithographic plates in colors and 180 illustrations. 388 pages. W. B. Saunders, Philadelphia, 1890.

This really valuable work, by Dr. Nancrede, now in its third edition, is intended, as the author states in his original preface, "to embody only those facts which have appeared to him to be really the 'essentials of anatomy.'" That this has met a want among students, and is a convenient book of reference to the general practitioner, is evident from the large sales.

The present edition has been enriched by thirty full-page colored plates, taken from the works of MacLise, Savage, Nuhn, and Hirschfeld, which so beautifully illustrate the topographical features that, as Dr. Edw. Martin says in his preface, "the student can compare his dissections at a glance." Such plates have not only a value in this direction, but add greatly to the beauty of the volume, from an artistic stand-point.

THE MEDICAL BULLETIN VISITING-LIST; OR, PHYSICIAN'S CALL RECORD. F. A. Davis, Philadelphia, 1891.

THE PHYSICIAN'S ALL-REQUISITE TIME AND LABOR-SAVING ACCOUNT-BOOK. Designed by W. A. Seibert, M.D. F. A. Davis, Philadelphia, 1891.

Both of these are issued for the benefit of physicians, and combine so much that is of practical value that they seem to cover all the necessities of the busy practitioner as far as the keeping of

accounts. The latter book is complete in its arrangement and fully justifies its title,—“Time and Labor-Saving.”

THE PHYSICIAN'S VISITING-LIST FOR 1891. P. Blakiston, Son & Co., Philadelphia.

This is too well known to need special commendation. The fact that it is in its fortieth year is sufficient evidence that it has become a necessity to the busy practitioner.

FRIESE'S DENTAL BOOK. H. D. Justi, Philadelphia, 1891.

This is one of the best of this class of memorandum-books. It is conveniently arranged with diagrams for marking. It has the almost fatal objection that they all have that the date and day of the week are left blank. This must be inserted by the operator, and few will take that trouble.

Domestic Correspondence.

TO THE EDITOR:

Will you kindly insert the following sets of resolutions passed, respectively, by the Massachusetts Dental Society and the New England Dental Society at the Union Meeting held last October in Boston.

Very truly,

EDGAR O. KINSMAN,
Secretary M.D.S. and N.E.D.S.

Resolutions by the Massachusetts Dental Society upon the death of Gustavus A. Gerry, D.D.S.

WHEREAS, Gustavus A. Gerry, D.D.S., of Lowell, Massachusetts, has been called by death from his earthly labors to his future reward. To the various associations with which he was connected in his life-work, and especially to the Massachusetts Dental Society, in which he held for many years an active and honorable membership, discharging an important trust in the capacity of president, his loss will be most seriously felt. Therefore be it

Resolved, That we deplore his early demise and the loss we as a society have sustained. His eminently good, sound qualities, his integrity of character in his professional relations, made him a desirable friend in all the walks of life.

Resolved, That our sympathy be extended to his family in their loss of a true husband and a kind father.

Signed,

W. E. PAGE,
JOS. KING KNIGHT,
S. G. STEVENS,
Committee.

Resolutions passed by the New England Dental Society upon the death of Gustavus A. Gerry, D.D.S., of Lowell, Mass.

WHEREAS, Once more we are called to mourn the loss of a beloved brother who, for so many years, has been our companion, co-worker, and friend. His pleasant smile, his words of encouragement, many graces of character, and a life of usefulness and honor make his memory a delight to us.

WHEREAS, His record is marked with fidelity, uprightness, and sincerity, therefore be it

Resolved, That in the death of Dr. Gustavus A. Gerry, of Lowell, Massachusetts, this society loses an active member, whose faithful earnest work is known throughout the profession.

Resolved, That this expression of our regret for his loss be entered upon the records of this society, and that a copy of these resolutions be sent to his afflicted family.

Signed,

C. A. BRACKETT,
A. H. GILSON,
R. R. ANDREWS,
Committee.

TO THE EDITOR:

The Twentieth Annual Meeting of the Kansas State Dental Association will be held at Wichita, Kansas, Tuesday, April 28, 1891, continuing four days.

The profession is cordially invited to meet with us.

C. E. ESTERLY,
Secretary.

LAWRENCE, KANSAS, January 8, 1891.

NEW ENGLAND DENTAL SOCIETY.

TO THE EDITOR:

Will you kindly insert the following list of officers of the above society in the INTERNATIONAL DENTAL JOURNAL, elected at the last annual meeting, held in Boston, October, 1890: President, Dr. W. E. Page, Boston, Mass.; First Vice-President, Dr. J. F. Adams,

Worcester, Mass.; Second Vice-President, Dr. S. G. Stevens, Boston, Mass.; Secretary, Dr. Edgar O. Kinsman, Cambridge, Mass.; Assistant Secretary, Dr. J. H. McQuade, Medford, Mass.; Treasurer, Dr. G. A. Young, Concord, N. H.; Librarian, Dr. A. H. Gilson, Boston, Mass.

Executive Committee.—Dr. C. W. Clement, Manchester, N. H.; Dr. George F. Cheney, St. Johnsbury, Vt.; Dr. J. E. Quinn and Dr. J. H. Daly, Boston, Mass.

EDGAR O. KINSMAN,
Secretary.

15 BRATTLE SQUARE, CAMBRIDGE, MASSACHUSETTS.

TO THE EDITOR:

American Academy of Dental Science.—The Twenty-third Annual Meeting of the American Academy of Dental Science was held at Young's Hotel, in Boston, on Wednesday, November 12, 1890.

The chair was occupied by the president, Dr. F. N. Seabury, of Providence, R. I.

The corresponding secretary and the treasurer presented their annual reports, which showed the society to be in a very prosperous condition.

Seven new members have been admitted during the past year, —viz., W. H. H. Thackston, M.D., D.D.S., of Farmville, Va.; William S. Sherman, M.D., D.D.S., of Newport, R. I.; George T. Baker, D.D.S., of Boston; H. S. Draper, D.D.S., of Boston; George H. Payne, D.D.S., of Boston; William Y. Allen, D.D.S., of Boston; and Geo. C. Ainsworth, D.D.S., of Boston.

The following officers were elected for the ensuing year: President, Dr. F. N. Seabury, of Providence; Vice-President, Dr. C. A. Brackett, of Newport, R. I.; Corresponding Secretary, Dr. Edward N. Harris, of Boston; Recording Secretary, Dr. Charles H. Taft, of Cambridge; Treasurer, Dr. V. C. Pond, of Boston; Librarian, Dr. Edward C. Briggs, of Boston.

Executive Committee.—Drs. Eugene H. Smith, Thomas Fillebrown, and F. E. Banfield, of Boston.

Members deceased during the past year: Drs. D. S. Dickerman, of Taunton; W. A. Bronson, of New York; Frank P. Abbott, of Berlin; E. B. Gardette, of Philadelphia; Henry J. Bigelow, of Boston; and G. A. Gerry, of Lowell, Mass.

Resolutions of respect to their memory were adopted.

The annual address was delivered at 4 o'clock P.M., by W. H.

H. Thackston, M.D., D.D.S., of Farmville, Va., ex-president of the Southern Dental Association, and he chose for the subject of his oration, "American Dentistry."

He was followed by Charles H. Taft, A.B., D.M.D., of Cambridge, with an address upon "The Progress of Science and its Influence on Modern Civilization." Both addresses were listened to with deep interest, and at their close elicited prolonged and hearty applause from all present.

Votes of thanks were given to Drs. Thackston and Taft, and copies of each address were requested for publication in pamphlet form. The Academy then adjourned at 6 o'clock to partake of the anniversary dinner. The party broke up at ten o'clock with many expressions of pleasure.

EDWARD N. HARRIS, D.D.S.,
Corresponding Secretary.

2 PARK SQUARE, BOSTON.

TO THE EDITOR:

I have before me a circular from Claudius Ash & Sons, of date November 20, stating that *they will be unable to import any further shipments of their teeth*, that they shall have to decline executing any further wholesale orders, and that the profession in this country can only be supplied until their present stock is exhausted.

The necessity for the above lies in the provision of the McKinley Tariff Bill, raising the duty on plain pin teeth from \$17.50 to \$52.50 per thousand.

It is a matter of serious interest to the profession to know the details of the McKinley Bill, so far as they effect dental materials. As a matter of news can you not give us this in an early issue of your magazine?

English teeth have special qualities all their own, appreciated by makers of metal plates, and by bridge- and crown-workers, and if it is the policy of our government to absolutely prohibit the entry of foreign materials necessary for our use as a profession, we ought to know it.

It would be a very interesting piece of information to know the names of the beneficiaries to whom the profession is indebted for the exclusion of English teeth.

Yours very truly,

CHAS. F. ALLAN.

NEWBURGH, N. Y., December 8, 1890.

TO THE EDITOR:

SIR,—It is a noticeable, as well as a somewhat painful, fact that certain individuals who attend the meetings of societies are in the habit of consuming much of the time allotted to gentlemen present for speaking by lengthy harangues, or speeches long drawn out, when the substance of all they impart could be easily summed up in a comparatively few words. As a result, those who are compelled to listen become impatient or weary, and some who are desirous of making remarks are debarred, and find no opportunity for speaking before the hour of adjournment is reached. Why cannot gentlemen be more considerate? If they have anything to say, say it in as clear and concise a manner as possible and give other's a chance to do likewise. Do not take hearers around Robin Hood's barn forty times before showing them how you enter, even though you have only a frog to exhibit. Get at the pith of your subject at once, without giving utterance to preliminary showers of irrelevant verbiage. Remember, dear time-monopolists, that "brevity is the soul of wit."

F.

Current News.

AT the Annual Meeting of the New York Odontological Society, held at the New York Academy of Medicine, No. 17 West Forty-third Street, Tuesday evening, December 16, 1890, the following officers were elected for the year 1891:

President, Wm. H. Dwinelle; Vice-President, Albert H. Brockway; Treasurer, Dr. Charles Miller; Recording Secretary, Dr. F. A. Remington; Corresponding Secretary, Dr. George A. Wilson; Curator, Dr. J. G. Sailer.

These officers, together with an Executive Committee and Editor (to be chosen by the above-named officers), will constitute the council of the Society.

NORTHERN OHIO DENTAL ASSOCIATION.—The Thirty-second Annual Meeting will be held in Oberlin, Ohio, at the Young Men's Christian Association, Association Building, Tuesday, May 12, 1891, at ten o'clock A.M., and continue its sessions three days. A cordial invitation is extended to all the profession.

HENRY BARNES,

Corresponding Secretary.

F. S. WHITSLAR,

President.

TAKING AN IMPRESSION WITH COMPOSITION.—First of all, I detach the handle from the tray and fix it in a slot, made so that it can be easily withdrawn. Having softened the composition, smeared well with vaseline, it is held over the lamp for a moment, and then placed in position in the mouth. The handle is then withdrawn, plenty of cold water used to gargle the mouth, then handle replaced and tray withdrawn. Result, a very perfect model.

A. BURNE, D.D.S.

SYDNEY, AUSTRALIA.

UNITED STATES PATENT-OFFICE.

DENTAL ANODYNE.

Specification forming part of Letters Patent No. 394,693, dated December 18, 1888.

To all whom it may concern :

Be it known that I, Robert Isaac Hunter, of Norfolk, in the county of Norfolk and State of Virginia, have invented a new and useful improvement in Dental Anodynes, of which the following is a specification.

My invention is an improvement in anodynes or obtundents employed for allaying the sensitiveness of decayed teeth, and thereby preventing pain during the operation of excavating the cavities preparatory to filling.

My compound is composed of the following ingredients, in the proportions stated : Chloral hydrate, six grains ; cocaine, five grains ; arsenic, ten grains ; creosote, twenty drops ; carbolic acid, five drops. These substances are put together and three drachms of water are added to form a complete solution of the solid matters. . . .

What I claim is,—

The improved dental obtundent or anodyne hereinbefore described, composed of chloral, six grains ; cocaine, five grains ; arsenic, ten grains ; creosote, twenty drops, and carbolic acid, five drops, substantially as specified.

ROBERT ISAAC HUNTER.

Witnesses :

AMOS W. HART,
D. L. HAZARD.

DR. THOMAS W. EVANS.

THE *New York Tribune*, of December 28, has a very interesting article of nearly two columns, giving a history of the life-work of this gentleman. The following extract contains information not generally known, and which will recall to the older dentists the excellent early training of Dr. Evans in the well-remembered place in Merchant Street, Philadelphia, where dentists of the earlier day procured their gold and silver solder, and physicians the most approved pessaries and delicate instruments.

"The doctor was called in as a friend when the Crown Prince Frederick was taken to San Remo, and remained there during the prince's stay. I happened to be at San Remo at the time, and it was there I became really well acquainted with the famous doctor. Every day he received despatches from the Empress Augusta at Berlin. It was he who sent her private advices constantly of the condition of her son upon the terrible day when it was thought that the Crown Prince would strangle when the operation of tracheotomy was decided upon. There was no one in the little Italian village skilful enough to make the silver tube necessary to be used after the operation was performed. It was here the skilled hand of the American doctor was called into play. I walked down with him to a little jeweller's office in San Remo, and saw him put on his workman's apron and begin with a blow-pipe and a hammer upon a five-franc piece. He worked there all night, and the next morning a beautifully-made silver tube was ready, and the life of the prince was prolonged, where suffocation would probably have set in within the next twenty-four hours. There was no mention made of Dr. Evans in the story of this operation. In the English papers it was Dr. Morell Mackenzie who did everything, even to the making of the silver tube which no one but an extremely skilful man, with a natural turn for mechanics, could have made with the simple materials found in a country jeweller's shop."

THE International Dental Journal.

VOL. XII.

MARCH, 1891.

No. 3.

Original Communications.¹

SOME CONDITIONS OF MUTUAL INTEREST TO THE DENTIST AND THE OCULIST.²

BY GEORGE T. STEVENS, M.D., NEW YORK.

AMONG the gratifying evidences of substantial advance in the training required for the practice of medicine is the fact that a more extended and general acquaintance with the whole realm of medical knowledge is now demanded of practitioners in certain lines of special practice than was formerly exacted.

It is within the recollection of all of us that the practice of certain branches of surgery was, even quite within recent times, regarded as so far relating exclusively to the part or organ treated, that beyond the special knowledge of the mechanism of the part and the procedures usually adopted, no training in general professional knowledge was regarded as essential or desirable.

One by one these special branches have become blended more and more completely into the general practice of medicine and surgery with great advantage, both to the specialty and to the general science.

It is not many years since the optician or the jeweller performed

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the New York Odontological Society, January 13, 1891.

services which are to-day regarded as among the duties demanding a high degree of technical skill and professional judgment on the part of the accomplished oculist.

Perhaps even a greater isolation from the general practice of medicine than in most other directions has existed in the practice of dentistry. The supposed local character of the defects and anomalies of the teeth, and the peculiar mechanical processes demanded in their management, led to a specializing in practice beyond that in most other branches. Fortunately, specialties in medical science are becoming less and less the field for narrow exclusions, and are more and more grounded upon a broad basis of general medical knowledge.

Without asserting that the specialist has yet reached the position, it is a pretty well recognized proposition that he should be one who, with an equipment of a broad and liberal training in general medical and surgical science, has brought an unusual amount of investigation and experience to a single department. Less and less will the practitioners in special departments regard themselves as isolated from those in other departments as the truth becomes more and more accentuated that the human organism is a unit and not merely an aggregation of parts. To attempt the discussion of the diseases of one class of organs, or the treatment of those diseases, without due consideration of all the organs of the human body, must prove, as it has always proved, in large measure, unsatisfactory. It might, doubtless, at first thought, appear, even conceding in theory what has just been advanced, that there can be little in common between the dentist and the oculist. Two special lines of surgical practice could hardly be more widely removed from each other in methods of examination or in details of procedure. I am sure, however, that a mutual understanding on the part of each of these two classes of practitioners of the conditions and methods which interest the other would contribute to the success of both.

It does not follow that the dentist should become expert with the ophthalmoscope, nor that the oculist should supply himself with the armament of the dentist. Each should, however, be thoroughly conversant with the general principles which underlie the practice of the other.

It is my purpose this evening to illustrate the mutual interdependence of these two apparently widely-separated specialties, by calling attention very briefly, not to all, but to a very few, of the conditions which should command the interest and attention of both classes.

We will glance, first, at the influence of the teeth in inducing reflex disturbances to the sight or to the functions of adjustment, and of nutrition of the eyes. Then we may consider the influence of the eyes in inducing, about the face and jaws, neuralgic disturbances, which are often erroneously attributed to the teeth. Next we may briefly refer to the influence of the eyes in the disturbance of the teeth themselves and of the jaws, and, lastly, our attention will be directed to the relations between the character of the dentist's work and the condition of his own eyes.

First of all, then, we are to examine the question of disturbances to the eyes and their functions, which may arise from the teeth. Naturally, this part of the discussion might be thought of more interest to the oculist than to the dentist; but there can be no hard and fast line of division between the interests of two classes of surgeons who must deal with conditions which are reciprocally related. The subject is not altogether new, and in this connection I need do little more than call your attention to that which is presented in the literature of your own specialty. I find in the "*American System of Dentistry*,"¹ edited by Litch, many pages devoted to ocular disorders induced by pathological conditions of the teeth.

The writer, Dr. Brubaker, sets out with the statement that, at the time of writing, the proposition that such disorders could be the result of reflex irritation from the teeth was hardly entertained by ophthalmologists, and he cites the absence of any allusions to the subject by Stelwag or by Wells, and to the only passing notice of any such relation by Graefe and Saemisch, as confirmation of his statement. That there was and is little in the text-books of ophthalmology upon this subject is true, and that much less than should exist is found in the periodical literature is also true. Nevertheless, I am of the opinion that ophthalmologists have in their practice recognized the relations between dental irritations and eye disorders to a greater extent than would be supposed from a cursory search of the literature. Indeed, so familiar to me was the thought of this relation, that I was quite surprised, on making such a search, at discovering that so little was actually to be found. I might refer to a number of my dental friends in confirmation of the statement that for many years I have been accustomed to send for their examination a considerable number of my patients, in whom the causes of asthenopic and other ocular symptoms have been obscure. I doubt not that many oculists have taken the same course while

¹ Vol. iii. p. 450.

neglecting to report their cases. However this may be, attention has been more especially called to the subject within the last few years than previously, and many cases are now on record which leave no doubt of the relation between dental irritation and ocular affections.

Of the large number of cases which Brubaker adduces, are some which are quite startling, and, indeed, some which must be accepted with certain reservations. For instance, a case of amaurosis of twelve years' duration is reported as cured within a few days, as the result of extracting a tooth. Now, while we may admit that a functional disturbance or even an organic disease of the eyes might be set up by an offending tooth, it would scarcely be supposed that an actual amaurosis could exist during so many years, quite independent of structural changes in the eye itself, if resulting from irritation set up by a distant organ; or, if such structural changes should have actually existed, we might reasonably expect that a cure would require a time in excess of a few days. Possibly in a case of spasm of accommodation, a condition which might easily be induced by reflex irritation, the patient might represent the confusion arising from the inability to obtain a focal adjustment as an inability to see. Something like this, indeed, often happens in the practice of the oculist. I am not infrequently informed by patients that the application of atropine to the eye, either by others or by myself, has been followed by complete blindness. In other words, the inability to see clearly an object at a given distance is in the mind of such persons associated with the idea of not seeing at all.

I suspect that a number of the long-standing cases of amaurosis, cited as being suddenly cured, may belong to this category. Nevertheless, the fact remains that whereas the eye of the patient rendered him little practical service, it was restored to usefulness after the removal of an irritating cause situated in the mouth.

Naturally, we place greater reliance upon reports of this kind when coming from a source which we can recognize as especially worthy of respect and consideration. Perhaps among those who have added considerable contributions to this subject, Galezowski may be regarded as among those least liable to be misled and best able to judge of the actual conditions represented as existing. Galezowski¹ calls attention to a variety of clinical experiences

¹ *Revue générale d'Ophthalmologie*, October, 1888. *Vide*, also, Widmark, *Annales d'Oculistique*, September and October, 1888. Also, Riva, in same journal.

bearing upon this subject, which he thinks has received less attention than its importance merits. According to him, during the first dentition many rebellious cases of corneal disease arise from the reflex irritation induced by difficult eruption of the teeth. Such cases recover only when the eruption of the teeth is facilitated. Neuralgic affections about the orbits, he believes, often arise from the second dentition, and finally, with the appearance of the wisdom teeth, occur still other forms of ocular troubles. Dental caries comes in for its share of ocular disturbances, one of its most common manifestations being accommodative asthenopia. This affection, he tells us, is often induced in cases where refractive errors do not exist, and he relates a number of cases of interest to illustrate his proposition. He also relates a case of blindness of one eye with no lesion shown by the ophthalmoscope, which he thinks arose from the extraction of a tooth.

It would be quite possible to put interpretations upon some of these facts somewhat different from those which are placed upon them by the distinguished oculist, while yet fully conceding the great importance of the source of irritation which he discusses. I am much disposed to regard the dental irritation existing in a considerable proportion of the cases to which reference has been made in the light of a collateral source of disturbance, rather than as the original and only disturbing element. For instance, let us take corneal ulcers, of which Galezowski speaks at greater length, perhaps, than of other eye-diseases arising from dental irritation. I observed many years since and reported the results of the observations to the International Medical Congress held in Philadelphia in 1876, facts showing that a very important factor in the causation of corneal ulcers is to be found in the anomalies of refraction of the eyes themselves.¹ My experience in later years has confirmed this view, but has led me also to regard the anomalies of the rotating muscles of the eyes as equally influential. The experience of others has in certain respects confirmed my own observation. In 1883 appeared in *Annales d'Oculistique* an article by Dr. Georges Martin, in which the writer presented facts and arguments in support of the theory that astigmatism, one of those refractive anomalies, is an extremely important factor in the etiology of corneal ulcers.² Other contributions in this line have added weight to this view of

¹ *Vide Transactions of the International Medical Congress*, Philadelphia, 1876.

² Sur le rapport qui existe entre une variété de la kératite grave "dite scrofuleuse" et l'astigmatisme de la cornée, *Annales d'Oculistique*, 1883, p. 15.

the subject. These writers, so far as I have observed, have taken a less extended view of this class of disturbing influences than was held by myself,—they regarding astigmatism only among these anomalies as a source of evil in connection with corneal troubles; while according to my own view, as stated in 1876, all of the anomalies of refraction were regarded as possible disturbing causes in this connection, and to which I would now add the anomalies also of the muscular apparatus.

Now, it is in this connection that I would call your attention to the very frequent disturbances in the function of development and nutrition of the teeth, which we find in children who have marked anomalies of the refractive and muscular states of the eye. This important consideration, although properly belonging to another division of this discussion, demands also a place in this connection. The excessive nervous expenditure to which children with anomalies of the ocular apparatus are subjected from the time that they begin to adjust the eyes may well be supposed to react upon their physical development and upon the phenomena of physiological functions.

At the period of dentition, when unusual nervous energy is demanded, the entire supply is already in requisition for the ordinary purposes of the child, and in overcoming the difficulties of ocular adjustments, for these make great demands upon the child's nervous power. Hence the eruption of teeth is difficult, not necessarily because of unusual resistance of the tissues overlying them, but because of the inadequate nervous force to push them out and heal the wound. The irritation of this arrested process is now felt in addition to that of the ocular irritation, and the reaction, which sometimes occurs elsewhere, is in certain cases located in the eye itself. Now, relief may be had by removing either the primary exhausting or the resulting irritating cause. In either case, after the removal of one, be it the primary or the secondary cause, there is often a nervous reserve sufficient to heal the local disorder. Hence, it may happen that corneal ulcers or other ocular diseases which occur at the period of dentition may be relieved by attention to this process, while the actual predisposing or underlying cause may be found in natural defects of the refractive or muscular apparatus of the eye.

In fact, my own experience has shown, in many instances, that if, in cases of this character, we can relieve the tension upon the accommodation, or that upon the muscular apparatus of the eyes, the powers of nutrition rally, and both the corneal disease and

the arrested or difficult eruption of the teeth take care of themselves.

Thus, it often happens that in a child with simple hypermetropia the application of atropine, which arrests for the time the overtaxed function of accommodation, will afford such a rest that the child at once recovers from his ulcer of the cornea and his entire physical force appears to be renewed. On the other hand, the child who is nagged by an astigmatism of not a high degree, will find equal relief if we instil into the eye a solution of eserine, or some other agent of its class, which stimulates the fretted and discouraged muscle of accommodation.

This important difference in the application of these two notable remedies has never, so far as I have observed, received any public recognition. Yet the principle has proved in my own practice a most valuable guide in the choice of an instrumentality for the relief of corneal ulcers in children.

Taking the view, then, that we have in many of the cases of corneal troubles, such as M. Galezowski has discussed, an original physical defect or group of defects which continues as a source of exhaustion and of irritation until neutralized or removed, and which may combine with dental or other local irritation and thus induce disease, we have a most important suggestion for both the oculist and the dentist.

By all means, then, let us remove the peripheral irritation, as we may find it located in the jaws; but let us not overlook a predisposing natural defect, which is very often behind this dental trouble and may give origin to it.

In what I have said upon this subject, I speak not simply from a theoretical stand-point, but from that of experience, and of extended and, as I believe, careful observation.

The second line of thought suggested in this connection is the influence of the eyes in inducing neuralgic disturbances about the face and jaws, which are often incorrectly attributed to dental irritation.

The precepts laid down by Neucourt, as I find them quoted in the "*American System of Dentistry*,"¹ in respect to these affections are very emphatic, and in my view might lead to erroneous practice. He says, speaking of facial neuralgia,—I quote from Dr. Brubaker's valuable article,—"When a tooth itself is the seat of pain and the patient definitely specifies it as such, there can be no doubt

¹ Vol. iii. p. 477.

that it is the origin of the disorder." Neucourt announces several distinct propositions relating to the causative effect of dental irritation in inducing neuralgia in the branches of the trigeminal nerves, all as positive and as little modified by exceptions as that which I have just quoted.

Admitting, as I do, and as every careful clinical observer must do, an intimate relation between the condition of the teeth and the irritations of surrounding and even of distant nerves, and recognizing clearly the fact that there may be, and sometimes is, facial neuralgia of uncomplicated dental origin, I wish to call your attention in the most emphatic manner to the errors which might result from following too closely the rules contained in the series of propositions, one of which is above quoted.

It is one of my familiar experiences to see patients who have submitted to the extraction of sound teeth, sometimes of a single tooth, sometimes of several, and in not a few instances of the whole group of teeth from one or both maxillæ, on account of neuralgia in the face or jaw, without experiencing any relief and indeed with the result of intensifying the painful disorder. Permit me to emphasize the statement by repeating it, that such experiences are with me not only not rare, but unfortunately somewhat common. In a paper on the subject of neuralgia, contributed by myself to the *Medical Record*, in 1877, I presented the details of a case of this class which is interesting as being, so far as I am aware, one in the first group of cases reported in which typical cases of neuralgia had been relieved as the result of corrections of ocular defects. In the case now referred to, the patient had suffered from pain of the most intense character, located in the face and jaw, during many years. She had been advised to submit to the removal of the teeth, all of which were sound, not only by her friends, but by a competent dentist. She had even, at the time when I saw her first, an appointment with a dental surgeon to have the supposed offending members removed. The patient was found to have a high degree of astigmatism. Glasses were given for its correction; improvement quickly followed and the entire relief which was gained continued during my acquaintance with her, which was more than a year. This case, except in the fortunate escape from the loss of the teeth, is a fair example of a very large class.

I cannot resist the temptation in this connection to submit my own personal grievance in the matter of extracting teeth for neuralgic affections of supposed dental origin. The worst of the grievance is that I am forced to acknowledge not only the error of my

dentist, an able and accomplished gentleman, who was fully sustained in his practice by recognized authorities, but my own weakness in permitting what, in an hour of less overwhelming pain, I would have forbidden either in my own case, or in the case of any one of my patients.

In addition to my professional labors, which were very severe at the time of which I speak, I had undertaken other work which demanded the most severe use of the eyes during several weeks until very late every night. Suddenly I was attacked with a most violent pain in one side of my face, the most intense focus appearing to be at a particular point in the upper jaw. After a good deal of intense suffering, I consulted my dentist, who assured me that there was an abscess at the root of the second molar and that I would get relief only from the extraction of the tooth. I preferred to suffer. Again and again I went, and as the pain became daily more unbearable and my own mental condition more desperate, I yielded to the repeated advice and submitted to the removal of a perfectly sound molar, which concealed no abscess. I returned to my room, took to my bed and remained a week under the influence of hypodermic injections of morphine. Gradually I became able to resume my work, and quickly learned that any severe employment of the eyes would induce a return of pain. I was forced to relinquish the undertaking which I had commenced and permit the eyes to rest during several months. Even now, after eleven years, any unusual severity in the application of the eyes continued for a few days brings back the old pain in the very spot from which the tooth was extracted. We are told by many writers that time is not to be lost in extracting these painful teeth; if there is special tenderness on tapping, or, if the tooth protrudes so that the tooth of the opposite jaw strikes it before its fellows, the indication is decisive of the presence of an abscess. I cannot regard these signs, singly or together, as constituting undoubted evidence of abscess, and I am sure that only the most positive indications should ever warrant the sacrifice of a sound tooth, or one which the skill of the dentist can make as good as sound. Even conceding the presence of an abscess, I am aware that dental science is too far advanced to demand the sacrifice of a sound tooth, for there are methods other than extraction for the relief of an abscess.¹

¹ During the discussion on this paper one of the gentlemen suggested that the practice of which I have spoken above is now obsolete. While, as I have stated, more conservative methods are known and followed, the practice to

It is not a part of my plan to discuss the diagnosis of abscess of the maxillæ. I wish only to impress the fact which is very frequently brought to my own notice, that ocular irritation is responsible for a great number of the neuralgic affections of the face, and that the wanton sacrifice of the teeth, in a blind hope of relieving pain in their vicinity, appears not to be good dentistry. I do not wish to be understood that I would permit an alveolar abscess to remain locked in until it could work its way out by some distant channel. On the other hand, I would remind the dental surgeon that he is the guardian and not the destroyer of the teeth. He should therefore satisfy himself, first, that an abscess actually exists, and, second, that he can find for it no outlet less damaging than that made by the destruction of an important organ; and, what may be of equal importance in preventing a painful affection from becoming an inflammatory one, he should be on his guard for sources of reflex disturbances, such as may be found in other parts, and especially in the eyes.

We turn now to speak very briefly of one of the affections of the jaw, which causes much trouble to the dentist, and much mental and often physical suffering to the patient. I refer to that deformity of the upper jaw called the wedge-shaped jaw. It has for a good while attracted my attention and my interest; it is that condition in which the upper jaw becomes compressed laterally and becomes angular in front, causing the upper anterior teeth to project and causing a difficulty, and in some extreme cases an impossibility, of closing the lips. Even when making a moderate effort to bring the lips in contact, a line of white shows between them, and in certain cases the whole of the front superior teeth.

This is not only a distressing defect, but one which it is to be hoped may some time be more than it is at present under the control of the dentist or physician. In all the cases which have come under my own observation, the defect has been progressive. It has not in any instance been a congenital defect, nor has it in any of

which I have alluded is still largely prevalent. An article in a very recent number of a prominent medical journal insists upon the early extraction of the tooth supposed to conceal an abscess. On the day following that on which this paper was read there came to my office a lady suffering from glaucoma. In this disease the eye becomes hard, and neuralgic pains of the face often constitute an important element in the symptoms. On the day before, the lady had had two sound teeth drawn in the hope of relieving the pain in the face. Thus, on the very day that our friend declared the practice obsolete, another dentist was extracting teeth for the cure of glaucoma.

those which I have studied been observed until the patient was a few years of age. In this respect, all the cases which I have noticed have followed a course somewhat similar to that of myopia. In myopia, according to the prevailing view, the subject is very rarely at birth, or in very early infancy, myopic. As the years advance, the eyeball gradually elongates, causing the patient to be near-sighted, and in most cases progressively so, the anomaly usually increasing during several years. In such progressively advancing defects, it is proper to inquire whether there is not some predisposing cause for the mal-nutrition which results in the defect, and if such cause may not be discovered and removed. So far as my observation has extended, I have found this wedge-shaped jaw only in persons who were the subjects of very marked defects in the equilibrium of the eye-muscles. This muscular condition has in all these cases induced important nervous disturbances, and I think there is ground for believing that, at least in a certain proportion of such cases, the mal-nutrition which has resulted in the defective form of the jaw is one of the reactions from the ocular disturbances. It may well be objected that the deficiency in muscular equilibrium is, like the defect of the maxillæ, acquired and progressive.

Time will not permit me to go into a discussion of this objection on this occasion, and I shall content myself by saying that the objection is not well founded; that the imperfect equilibrium of which I speak is congenital and not acquired. It is certainly the case that these ocular anomalies cause important nervous disturbances, and there is no physiological reason why a disturbing cause should not induce structural, as well as functional, irregularities. In this statement I find myself in accord with some of your most distinguished authorities.¹

I have called attention to this defect of the jaw and its possible relation to anomalies of the ocular muscles, as a single example of a class of defects which come under the observation of the dentist, and which should lead him to the study of the nervous influences which are predisposing to them.

It is at least legitimate, when a fault of nutrition of this character is found associated with a known cause of irritation, to remove

¹ For instance, I find in Kingsley's well-known work on "Oral Deformities" the view, that the development of the jaws and teeth is largely governed or modified by the condition of the nervous system, frequently emphasized; and he declares that abnormal dental development and nervous diseases are correlated and spring from the same cause (page 22 to 25).

such cause as one of the steps in arresting the progress of the defect.

Let us now briefly consider the branch of our subject which has a personal interest to the dentist, namely, the influence of his special work upon his own eyes.

There are few classes of workers whose eyes are forced to perform more laborious service, and, I suspect, few in which the results are more troublesome. If we were to take a census of the strong men between the ages of thirty and forty years in the general practice of medicine and in dental practice, who suffer from oft-recurring sick headaches, from dizziness, from habitual pains about the back of the head, from frontal headache, and from various other neuroses, I feel confident that by far the greater proportion would be found not among the general practitioners, but among the dentists. When we consider the character of the dentist's work, especially of one who devotes much of his time to filling of teeth, we cannot fail to see that his eyes are harnessed to his work in an unusual manner. Hour after hour he is gazing with careful attention upon a small fixed point situated in a locality never very strongly, and often very poorly, illuminated. He cannot thus fix his gaze for a long time without making unusual demands upon the nervous energy by which the adjustments of the accommodation and of the mutual relation of the eyes is maintained. Hence, this department of dentistry must of necessity be one in which large demands upon the nervous energy of the practitioner are made, even in case of one in whom the functions of accommodation and of adjustments of the eyes are most favorable. This being the case, how much more expensive must these prolonged efforts at fixation of the eyes become to one in whom there are defects in the refractive or muscular apparatus of the eyes? If, in the first case, work is laborious, in the second it must be exhausting.

For many years I have called attention to the reflex troubles arising from difficulties in the management of the eyes, and I need not repeat what has already been said. Let me only remind you that the needless expenditure of nervous energy is a waste. One or two illustrations of such a wasteful expenditure may help to impress my meaning.

Let us suppose a person who is hypermetropic and whose occupation demands long-continued efforts at accommodation of the eyes at near points. In hypermetropia the eye is short, and a greater effort is demanded in adjusting in accommodation than in

the ideal eye. Just in proportion as the hypermetropia is greater, is the demand upon the nervous energy greater in accommodation. Given, then, two persons, in other respects equal, one of whom is hypermetropic, the other not; the first in a given number of hours of labor at accommodation must expend a greater amount of energy than the second. In other words, the hypermetrop goes to his work handicapped. Again, suppose one performing a given class of work to have defective muscular arrangements of the eyes by which a greater demand than is required in equilibrium is necessary in bringing the visual lines to fix upon a given near point. It seems hardly necessary to say that the extra energy demanded in bringing these lines to the proper point and holding them there, is so much additional labor, and that of two persons otherwise equal, the one possessing the defect is at a serious disadvantage.

Not only are those persons subject to natural defects of the adjusting apparatus of the eyes at a theoretical disadvantage, but in fact, as a class, such persons are more subject to complaints arising from an exhaustion of nervous forces than others.

The natural and logical conclusion from this statement is that a class of workers who make unusually severe demands upon the eyes should make intelligent and reasonable provision that the organs from which so much is required should be placed in the best possible condition for the performances of this work with the least unnecessary expenditure of force. These defects are not disease. The subject of them is not usually aware of their existence. The visual power may be good and the eyes themselves may feel no sense of strain, yet the nervous energy may be rapidly expended through their influence. There are some who by virtue of great reserve energy are able to contend with these difficulties for many years with little, if any, appreciable effect upon their general strength. How much more such persons might be able to accomplish were they free from such disadvantages, is a matter for conjecture. It is certain, however, that no worker who aims at the best results can afford needlessly to expend the power with which he must accomplish his work, and it is also certain that one who thus expends needlessly a considerable proportion of his working capital of nervous energy is so far at a disadvantage in the competitions of life.

THE OBTUNDING OF SENSITIVE DENTINE.¹

BY GEORGE F. EAMES, M.D., D.D.S.

THE dentist who has just used an excavator in removing a little superficially decayed dentine finds an immediate response from the patient, who informs the operator that he has "struck the nerve." The dentist kindly explains that it is only "sensitive dentine," at a considerable distance from the nerve itself. If asked, "What is sensitive dentine?" the practitioner will say, if well read in all the modern literature pertaining to this subject, "I do not know; I can only designate it by certain phenomena consequent upon irritation of this structure. We all know that it is often sensitive or painful when touched, and we name the condition from this symptom alone, because we have no real knowledge as to the *modus operandi* or mechanism by which pain is induced, or of the peculiar condition of the parts involved which permit these phenomena."

In recent years pain obtundents and local anæsthetics have been introduced in great profusion, while there is a scarcity of literature which considers the physiological and pathological basis upon which anæsthetic agents may be used. This indicates that the general practice is largely empirical, and this impedes the progress of the profession.

It is time now to ask why the obtundent obtunds and how it does it. Allow me, if you please, to refer to the anatomy and physiology of tooth structure only in sufficient measure to be of assistance in more clearly elucidating the subject. We are to speak principally of the dentine which forms the main bulk of the tooth, and within which is a canal or canals with the largest diameter at the pulp. At the periphery of the pulp and the dentine is a layer of odontoblastic cells which send prolongations into the dentinal tubuli.

This description is, in substance, I believe, generally accepted, although, like other anatomical structures that are microscopic, it may be questioned. Magitot, for instance, denies the existence of these odontoblastic cells, holding that the dentinal fibril is a continuation of a layer of reticulate cells which lie beneath the odontoblasts, while Klein maintains that the only office of the odontoblast is in the formation of the dentine matrix, the dentinal fibril being a prolongation of cells originating between the odontoblasts.

¹ Read before the Academy of Dental Science, Boston.

All must agree, however, in the existence of a protoplasmic material throughout the entire structure of the dentine, giving it both nourishment and sensation. We say sensation: *why* do we say it? Is the dentinal fibril capable of transmitting sensation? Let us see. The functions of the dentinal fibril, the various influences that may affect it, its relation to the tooth-pulp, may well form the principal subject-matter for our study in sensitive dentine, for it seems only reasonable that, whatever may be the method of conducting painful sensations from the dentine to the brain, this living matter in the dentine must be the *medium* through which it reaches the pulp. The sensation of pain having reached the pulp, we readily see how it may be conveyed to the brain by reason of the well-known function of the sensory nerves; but the dentine has no nerves; this protoplasmic material occupying the dentinal tubuli has not been shown to be nerve-structure. How, then, may it be the medium or have the power of transferring sensations?

We have already noticed the very intimate relations existing between the odontoblastic prolongations or dentinal fibrils and the pulp. Let us now notice some of the characteristics of this so-called dentinal fibril. For this purpose we have recourse to some of the simplest forms of life, and from them receive valuable knowledge, as Paget so admirably writes: "The highest laws of our science are expressed in the simplest terms in the lives of the lowest orders of creation." These odontoblastic cells forming the dentinal fibril seem to consist of simple masses of protoplasm, of which the *amœbæ* and the leucocytes are good examples, all possessing similar characteristics, so that we may draw reasonable conclusions from them. The *amœba* may be easily observed under the microscope. We find that it is capable of moving, with extreme slowness from place to place; that it is sensitive to mechanical and chemical irritation, as shown by the change in its movements and in its form. It is especially sensitive to thermal changes. If the temperature be raised to 95° or 100° F. the movements are arrested, but if this amount of heat be not sustained too long, the *amœba* will resume its power of moving. The same thing occurs when the temperature is reduced to the freezing point. If the temperature is reduced *below* the freezing point or raised above 105° F., the movements entirely cease and are not resumed on raising or lowering the temperature again; in other words, there is cessation of function,—the *amœba* is dead. This is the effect of heat and cold upon protoplasm, as shown in the *amœba*, the leucocyte, and, with possible modification, in the dentinal fibril.

These results suggest the possibility of painful sensations being transmitted to the pulp and thence to the brain through the agency of the fibril. They also suggest the possibility of injury to the pulp by means of hot or cold applications to cavities in the teeth. If this theory be true, then in every cut into the dentine with the excavator we are wounding living tissue, and this irritation is converted into pain when it reaches the pulp.

But my main purpose in calling your attention to the anatomy and physiology of the dentine is that we might better understand the effect of heat or cold as applied to sensitive dentine. Heat is applied in various ways, dry or moist, but one of the recent methods of using moist heat is that in which a jet of steam is applied to the cavity; others consist in the use of a spray from a very volatile liquid like chloride of methyl, bromide of ethyl, or ether. In the use of these agents, as well as steam, the heat or cold is intense, and it seems to me that, in making use of such extremes of heat and cold, we may be expecting too much of the vitality of the dental pulp. The protoplasmic cell, identical in its nature with the dentinal fibril, is destroyed at a temperature above 105° F. or below 32° F.

The dentinal fibril being in such close connection with the pulp, and perhaps through it in some way fortified with an extra amount of vital force, or resisting power, may be able to recover after the application of a greater amount of heat or cold than a portion of isolated protoplasm. However this may be, in the light of the foregoing statements I am bound to say that I believe there is danger in the general use of such extremes of heat and cold as are produced by the spray of ether or chloride of methyl.

I am fully aware that these agents are used in a large majority of cases, as I have used them myself without perceptible injurious results at the time, and I believe that what has been written advocating these remedies is in the right direction, but I do not think sufficient time has elapsed to enable us to judge correctly. An application of steam two seconds longer in the case of one patient than in another may be enough to make the difference between success and failure. It seems to me that such nice adaptation to the temperament of an individual cannot always be made by ordinary mortals.

Now, I am sure that we can make use of heat or cold in sensitive dentine without injurious results, and in this way: By using an apparatus which will indicate the temperature; in other words, by knowing the dose to be administered. The method which I wish

to commend, and which I believe can be used in the greatest number of ways, is the use of warm air at a certain definite degree. If we are to be guided at all by our observations of the effect of changes in temperature on the *amœba*, we shall not raise the heat above 110° F. or reduce it below the freezing point. I am sure that I have accomplished much with this degree of heat, although I do not pretend in any dogmatic sense to fix the border line beyond which we cannot use heat or cold with safety.

I have recently been using Codman & Shurtleff's air-compressor, and have had several appliances made to connect with it, heating the air, still under pressure, and conveying it to the mouth, and by means of a valve and fine tube having it under full control. My last apparatus was an air-tight brass tank containing a thermometer, which indicated correctly the temperature of the air *in the tank*, but very hot air in passing through six feet of rubber tubing will become cold.

I am experimenting with a much smaller instrument, which can be placed on the bracket table and brought near the patient.

Air, under pressure, made warm at will, may be made to serve many useful purposes besides obtunding pain. It is the very best means of producing a spray from any liquid, and there are many uses for the spray. Hot medicated air may be driven with great force if desired into a root-canal, or used as a chip-blower, or to hasten the hardening of modelling composition when used for impressions of the mouth, to soften gutta-percha fillings or crown-settings, etc.

Permit me now, if you please, to indicate something in the line of treatment, according to my view of the situation. We may find a condition of general or local nerve irritability, or both. I sometimes treat systemically, using laxatives if needed, followed by such sedatives as sodium bromide, Jamaica dogwood, or aconite, avoiding the menstrual period when possible, and give morning appointments as a rule.

A combination of kindness, patience, mesmerism, hypnotism, Christian science, mental healing, magnetism, sharp instruments, and a steady hand is always on the shelf for use, and I see no antagonism or incompatibility between the ingredients. For the local and the general condition in excessively sensitive dentine, the inhalation of ether has been with me a decided success. The patient usually holds the napkin and inhales until the first effects are produced, stopping short of unconsciousness. The odor is an objection, of course. I do not use it often, but when I do it is to me the king

of remedies. I have frequently used nitrous oxide for this purpose with much satisfaction. But cocaine is the remedy that I use most, and I believe it to be the safest and most efficient local anæsthetic that we have at our command to-day. This is the way I use this agent and succeed: After the cavity is dry I make it dryer by the use of warm air; the dehydration of the tubules and the raised temperature not only lessen the sensibility, but also provide for the absorption of any medicament that may be placed in the cavity. Alcohol is also used for drying, alternating with the warm air until I think it sufficient for the purpose; it is then ready for the cocaine. I formerly made an alcoholic solution, but believe it to be better practice to use the cocaine and alcohol separately.

Our studies in experimental therapeutics show that alcohol is absorbed very slowly if at all, while acidulous and chloroformic solutions are absorbed with facility. I therefore have used chloroform alternating with an aqueous solution of cocaine, although I now make my solution of cocaine in chloroform alone. The dentinal tubules being deprived of moisture by means of alcohol and warm air, now readily drink up a chloroformic solution of cocaine.

I have used this method with the above modification with decided success. I think it is believed by the profession generally that cocaine is of little value in sensitive dentine, and I had reached this conclusion myself; but a physician once insisted upon my using it in his tooth, and he had so much faith in its efficacy from his experience with it in the soft tissues, that I made a thorough application with fair success; later I became interested in experimental therapeutics, resulting in the use of cocaine as I now use it. The only obstacle to its application in and around the teeth is the difficulty of securing absorption. If you can once cause it to reach the spot where you want it to act, it will anæsthetize every time it is applied.

THE FUNCTION OF THE ODONTOBLASTS.¹

BY J. E. STANTON, M.D., D.M.D., BOSTON, MASS.

ABOUT two months ago I had the pleasure of listening to a paper upon, and seeing some photographic views of, "New Formations in the Pulp-Cavity," or in the pulp itself. Dr. Cooke, of our Society, was the author of that paper, which, with the one read by Dr. Blaisdell and the discussion following, suggested to me the subject upon which this present paper is founded. In many of the specimens which Dr. Cooke presented, he observed and called attention to a membrane on the surface of the pulp. Dr. Cooke's specimens were all dried teeth which had been broken open for the purpose of finding the new deposits. This membrane was quite distinct from the rest of the pulp and the surrounding tooth, and you will easily recognize it as the *membrana eboris*, the ivory, or dentine-forming membrane, consisting of the layer of odontoblasts with which every pulp is surrounded. We all know that this layer consists of cells which are nucleated, each cell having three processes,—one to the deeper tissue of the pulp, another to the neighboring odontoblast, and the third running into the dentine, under the name of the dentinal fibril. We also know that it is through this odontoblastic layer that the tooth is formed, nourished, and kept in a healthy condition; in fact, this might be called the internal periosteum of the tooth. In the formation of the tooth the epithelium or epiblast dips down into the deeper layers in the form of a pear-shaped bulb, which becomes invaginated, and ultimately becomes the enamel-forming organ. Coming up from the mesoblastic stratum, which is the middle layer of the embryo, are cells in the form of a pyramid which fit into the invaginated portion of the epiblastic layer. This is the future tooth; strictly speaking, it is the first indication of dentine, and dentine is really the tooth, since it retains the shape so exactly after the enamel and cement are removed that we are enabled to name it correctly. This layer of cells proceeds at once to deposit the lime which it finds in the circulation and gradually builds up the form to its type limitation. As the tooth is developed from without inward, the odontoblasts recede until ultimately in advanced age the entire pulp is converted into dentine.

Is it not possible for us to treat exposed and diseased pulps

¹ Read before the Harvard Odontological Society, June 23, 1890.

more intelligently if we bear in mind, during the application of our remedies and coverings, this proper function of the odontoblastic layer, and regard it as surgeons do the periosteum of bone? They are careful to preserve that bone-forming and repairing membrane when they wish to treat a diseased bone, while we with many of the applications made to the surface of an exposed pulp will destroy the layer of odontoblasts which are the ivory-formers and repairers of the tooth. In a very large proportion of the cases shown by Dr. Cooke, the teeth were either filled, had cavities of decay, or had been injured by being clasped for the purpose of retaining artificial dentures. The injury was a deep one, resulting in all cases, so far as I was able to judge, in the formation of pulp-stones, nodules, or the conversion of the entire pulp into a mass of unorganized lime. In all cases the injury resulted in the formation of lime deposits in the substance of the pulp. From this one might infer that the amount deposited was in proportion to the length of the life of the pulp after receiving the shock which ultimately paralyzed the odontoblasts, and prevented them from converting the lime which was carried to them into normal dentine.

The pulp is peculiar. There is no other organ in the body like it; it has hardly any regular anatomical organization; there are no lymphatics to remove the products of disease or injury, and whatever change takes place in it is brought about by the agency of the odontoblasts, for, exclusive of these cells, the pulp substance is little more than embryonal tissue. This being the case, how careful we should be not to injure, by harsh fillings, pressure, or irritating applications, the only portion of the pulp which is capable of self-restoration. Is it not possible for us to attain greater success in the treatment of exposed pulps, if we consider them as we do other inflamed tissue, which needs soothing applications and free ventilation until the inflammation is subdued, rather than by sealing them up, or by flooding the odontoblasts with some escharotic that destroys these delicate cells? I will not attempt to outline a successful treatment, but trust some of us will get an idea from what I have said which may modify the present doubtful treatment of exposed pulps, or replace it by a more certain and successful one.

ANÆSTHETICS IN DENTAL PRACTICE.¹

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OWING to the limited time apportioned to the speakers on this problem,—the science and art of chloroform anæsthesia,—I am forced to content myself with a few thoughts on the subject from the purely practical and ethical aspect. These being only culled from my original design, consequently will be few and probably of a rambling character. First, then, the selection of an anæsthetic is a question of great importance. I do not touch upon the personal points which render patients suitable for the anæsthetic condition, but may state that I do not remember ever having denied this boon when I deemed the severity of the operation rendered it justifiable; at the same time denying it when I conscientiously considered that by its administration I was simply pandering to an ungrounded and silly fear. I should consider myself sadly wanting in professional resources, in such cases, if I could devise no other means of allaying unfounded trepidation than by the complete overthrow of reason and the obliteration of sense and feeling. On the other hand, I am constrained to maintain that, even in cases of organic disease, the grounds on which the administration of an anæsthetic are denied are of a very slender and doubtful character; and even when a severe operation has to be undergone, in the presence of organic disease, I am distinctly of opinion that the chances of safety are greater *with* the anæsthetic carefully administered, the powerful shock to the system which would otherwise be caused being thus obviated. Again, anæsthetics, we should bear in mind, are successfully administered with great frequency in cases of organic disease, where its existence has never been suspected. Again, in the great bulk of cases of death from anæsthetics post-mortem examination reveals no appreciable lesion whatever, and, in a third class, the existence of organic disease is only disclosed during the process of anæsthesia. Of the latter example, a case recently came under my notice in a young lady of average healthy appearance. No suspicion leading to the use of the stethoscope was excited by objective phenomena. When about to operate, after the production of anæsthesia, a visible regurgitation was noticed in

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the vessels of the neck. Other things being well, I proceeded with the operation. Having taken the patient, after recovery, into my confidence, she coolly confessed to me that she knew she was laboring under heart-disease, but did not speak of it for fear I should refuse to administer chloroform to her. The *care* which *should* be taken in every administration of chloroform is adequate even in cases of known existing disease.

In what we call large operations in our department of surgery,—that is, when a great number of diseased teeth and roots are to be removed,—in order that the patient may not suffer from the depressing effects of anticipation, and the frequent repetition of operations, it is, as a general rule, best to administer chloroform or ether. Of the latter I have not had much experience, and thus do not consider myself justified in speaking regarding it; but this I may say, I recently performed a large operation under its influence, which was in *every way* highly satisfactory. An especial feature was the speedy recovery, almost equal to that of nitrous oxide gas, in all sufficiently encouraging to recommend its use. If both jaws are to be operated on, it is usual to recommend—unless unusually favorable conditions exist, such as well-absorbed alveoli and little hemorrhage—to divide the operation into two periods, with as long an interval between them as general circumstances will admit.

Medical men in giving chloroform for a dental operation very generally have a dread of the blood, which is at first very copious, getting into the air-passages. In one case which occurs to me, a well-known surgeon of this city, now deceased, insisted on plugging each socket as a tooth or root was extracted. I do not remember in all my experience having seen a case where bleeding in this manner gave trouble save in temporarily concealing the teeth to be removed and thus complicating matters for the operator. My care has been more directed to prevent the chances of its being swallowed, so as to obviate the severity of the sickness and vomiting, having a conviction that one cannot digest one's own blood; and which, if not wholly ejected from the stomach (in the coffee-grounds condition), produces constitutional irritation, such as fever and malaise, in proportion to the amount retained.

In falling back of the tongue, a not uncommon occurrence, I find especially young practitioners diving at it with artery forceps, heedless of laceration and subsequent obloquy. I do not remember ever having used the forceps, finding it equally efficient to grasp the lower jaw with my left hand and with my forefinger well at the back of the tongue pull the whole forcibly forward.

With regard to position in our operations, it goes without saying that the perfectly recumbent position is against the interests of the dental operator, inasmuch as the angle at which he is to work is peculiarly disadvantageous. I remember in my father's practice, and in my own early experience, sitting in the operating-chair was the customary position, not much removed from that for other dental operations. I do not advocate in favor of incomplete recumbent position, but, for reasons to be afterwards advanced, it would not be culpable to deviate from it to some extent and upon explainable grounds. I would not have you regard me in open rebellion with all acknowledged authority, nor incur the criticism of the Hyderabad Commission, who claim this as "No. 1" in their practical conclusions; but, in fulfilment of my intention when I began, I am bound to relate my own personal experiences.

Nitrous oxide is undoubtedly a valuable anæsthetic to the dentist, and ought to be to the general practitioner. Its unquestionable drawback in lengthy operations is the transitory nature of its effects, an advantage of safety, but one which minimizes its popularity in general surgery. If well administered,—I mean by that the perfect exclusion of atmospheric air,—the anæsthesia is complete and nearly always universal in its physical demonstrations. It is perhaps to this feature that it owes its popularity as a safe agent, it being not so subtle nor deceptive as its ally, chloroform. The operator can determine the changes it is producing in the great nerve-centres more plainly, and coincident with the cutting off of the supply recovery is commenced,—*i.e.*, a steady return to the standard oxygenation of the blood. I am astonished that it is not more frequently used in short and painful operations in general surgery, but, as it is, it is the peculiar property of dental surgeons; and it is the more astonishing, seeing that the popular mind is assured of its complete safety. I have given it frequently to medical friends, for operations such as opening abscesses, cutting carbuncles, and the other night administered it with complete success while a medical friend excised two tonsils and a mass of adenoid growths from the naso-pharynx in a girl of about ten years. In many cases of painful and, if you choose, minor operations in general surgery, if a man is well informed as to what he has to do, and prepared to do it dexterously, he will find this anæsthesia sufficiently deep and prolonged, and save his patient the discomfort of the after-effects of chloroform. I feel constrained to ask surgeons to give it a trial in parallel cases, and my willing services will be at their command. It is but right to state that nitrous oxide has been objected to on

the ground of its causing certain mental perversions, but in my experience I have not encountered much of this, as their occurrence, to a large extent, may be anticipated by confident assurance and general comportment on the part of the operator.

I hardly intend to speak of deaths or threatened deaths under gas or chloroform, expecting the discussion of it in abler hands than mine, but I may be excused a remark or two on this head. We all know that death takes place not unfrequently from chloroform, that such incidents are frequently brought under public notice by the lay press, and we know also that not a small percentage of chloroform deaths are never heard of beyond the operating-room, while the same issue so rarely accompanies the administration of nitrous oxide that fatal cases might be numbered on the fingers; the only one that occurs to my memory, other than the Exeter case which happened some years ago, and in which the fatal result was due to the gag getting into the windpipe, is that of a notable lady in Edinburgh; and this case furnishes a good subject for signaling one or two points worthy of being alluded to. In this case death did not occur under the anæsthetic, but followed directly as the result of it. The patient was depressed by nervous apprehension of the operation, and had expressed her conviction that she would die under it. This depressing influence was brought to bear upon a fatty heart, and determined the fatal syncope. Two other conditions to which I beg your attention: The dress fitted so tightly that its removal was accomplished with difficulty, and the stomach was distended with undigested food, part of which was vomited during the performance of artificial respiration. The *Lancet*, in reviewing all the circumstances, said: "There is no reason for going back from the position which modern anæsthetists have occupied, that nitrous oxide is not only the safest anæsthetic we possess, but that when it is circumspcctly given, it is practically free from danger save in cases of very advanced diseases of the heart or lungs." The *British Medical Journal*, after a dispassionate consideration, blamed the neglect of precautions on the part of the patient rather than to any particular danger from the anæsthetic. Now, from the fact that this lady had taken food early in the morning and that she was not operated upon till noon, and that even then the stomach contained undigested food, we are reminded of the physiological truth that during restraint of heavy nervous apprehension the functions of digestion are largely arrested, and hence we should be guided in our recommendations modifying our dietary instructions in accordance with the physiological re-

quirements of the case. In pregnancy I had at first some misgiving as to the administration of gas, but in this condition I have frequently administered it without any outward symptoms except a tendency to vomit, which is not common in ordinary circumstances. In valvular disease of the heart there is a tendency to syncope with gas. Among other phenomena may be noticed increase of the pulse, increased cardiac force, loss of tidal wave, accentuation of dicrotic curve, and opisthotonos most common in females. The pupils are generally dilated, but this is not to be depended upon as a test of the narcosis. It is worth remarking, on ethical grounds, that erotic movements and sexual illusions are not uncommon.

Just a word about idiosyncrasy in chloroform anæsthesia. This is a point that I have merely alluded to, and I feel it is of more importance than is generally thought of, at least sufficient to justify its being looked upon as an item of *attentio* in administering the drug to a patient for the first time. As to how it acts differently on different individuals would be as easily answered as the well-known idiosyncrasy attending the effects of mercury and some other medicines. Some years ago, before the supremacy of nitrous oxide gas, I had to administer chloroform to a young lady for the removal of a tooth. I used a handkerchief in the form of a bird's nest, and the position of the patient was not quite semi-recumbent, less than a teaspoonful of chloroform was sprinkled, and plenty of atmosphere allowed. She had a large protruding glaucomatous eye which from the first focussed itself upon me with so fixed a glare that in less than half a minute I was induced to put my finger on it. Finding it quite insensate, I removed the napkin and, she being completely insensible, hurriedly extracted the tooth; being still unconscious of the operation, I looked for more bad teeth and had them out. Almost immediately afterwards she awoke entirely well and unconscious of what I had done, and grateful for what I had taken upon myself to do. In another case that I had with the late Dr. J. G. Wilson, in which some ounces of chloroform (I am afraid to say how many) were used to remove a number of bad teeth and an epuloid growth, the lady seemed proof against its influence, and I had to operate while she was still conscious and sensation only slightly obtunded. I mention these two extreme cases to show, on the one hand, a hypersusceptibility, and, on the other, an obstinate tolerance, to justify the consideration of idiosyncrasy.

Let me say a word on the ethical aspect of the subject. I need not say that the after-effects of chloroform are often of a very

humiliating character from the nausea and vomiting, and especially so in dental operations, when the blood enters into the stomach; this, combined with the physical prostration and general demoralization, renders it, as a rule, better to have this performed under the influence of home comforts. I never have a chloroform case in my house but my heart goes out to the patient, when I see them hustled into a cab, and I am inclined to crush my thoughts of the misery that is being endured while they rattle over the stony street. This is the social consideration; but still worse remains behind when I think of it from the scientific point of view. I need not say that the patient is thus placed in a position far removed from comfort if not safe recovery. It is also morally better for the patient, to be saved the depressing influence of fear on being brought face to face with the horrors of the surgical armory, when any such may be ameliorated by the kindly influence of domestic surroundings. Time prevents me from detailing the advantages that show, as a rule, that it is preferable to chloroform in the patient's own house. I also cannot enumerate the disadvantages it is to the dental operator, but I am persuaded that these would be outweighed by the paramount consideration,—the welfare of the patient.

The other point which might be considered in this discussion is, In how far is one medical man justified in administering chloroform without the presence and assistance of another? I am persuaded that many here will estimate that it admits of an element of cowardice to seek the help of another, while, in reality, it is the demonstration of real bravery, and an evidence of high moral culture. That which makes up the self-possession of youth is often but the offspring of ignorance or, if you will, inexperience,—and the success of their actions is gained in the game of hap-hazard, but the matured, who have gained experience in the trying ordeals of professional life, can discern more clearly the sands and shoals of the social and professional existence. It is in such, though cloaked from the outer world, that the secret misgivings are strongest. The more his experience teaches him the better he realizes the great mystery, until the culminating end reveals his own littleness and complete dependence. So I am prepared to think that it would be the younger men, and the least experienced, who might dissent from recommending the necessity of a plurality of attendants at the giving of an anæsthetic. It is only those who have grasped the grave responsibility of hanging by a thread the life of a fellow-creature who would not deem it an act of compromise to seek help in bearing the strain; and I am persuaded that there is

not a head grown gray in medical service but would approve and urge the advisability of two being present in the production of chloroform anæsthesia, and even encourage legislation in its favor.

Lastly, there are some, again, who would urge against it, on the ground that patients would grudge the expense possibly entailed by the multiplication of medical attendants,—let me say that I never heard it objected to on that ground, even by those who appeared well able to afford it. Be that as it may, to us, members of an acknowledged unselfish profession, other means may be found so that objection may not stand in the way of offering the best human security for a life in imminent peril.

Reports of Society Meetings.

AMERICAN DENTAL ASSOCIATION.—THIRTIETH ANNUAL MEETING, EXCELSIOR SPRINGS, MO., AUGUST 5 TO 8, 1890.

(Continued from page 117.)

Thursday Evening's Session.

THE session of the American Dental Association, Thursday evening, was held at the Opera-House at Excelsior Springs, Mo. The first business was the election of officers, with the following result: President, Dr. A. W. Harlan, of Chicago; Vice-President, Dr. J. D. Patterson, of Kansas City, Mo.; Second Vice-President, Dr. H. B. Noble, of Washington, D. C.; Recording Secretary, Dr. George H. Cushing, of Chicago, Ill.; Corresponding Secretary, Dr. Fred. A. Levy, of Orange, N. J.; Treasurer, Dr. A. H. Fuller, of St. Louis, Mo.

Dr. W. W. Allport, of Chicago, moved that the question of the place of the next meeting be left with the Executive Committee. This elicited considerable discussion, and the appointment of a board of business managers was suggested.

Dr. A. W. Harlan was then escorted to the chair. He briefly thanked the Association for the honor conferred upon him and assured the members that he would work for the best interests of the organization.

A resolution complimenting the management of the hotel and Opera-House at Excelsior Springs for the favors to the Association was next introduced and unanimously carried.

Dr. Hunt, of Iowa City, Iowa, then addressed the convention upon the blood-supply of the teeth. Dr. Hunt explained that the accepted idea concerning the blood-supply of the teeth is that it is derived from the maxillary arteries by branches which pass directly from the artery to and through the foramina of the various teeth. Dr. Hunt's position is that the supply is not direct. He holds that it passes from the artery through the bone of the maxillary processes by circuitous routes to the pericementum, from which it

is distributed by what may be called a capillary system to the foramen. He claims to have demonstrated positively this idea in the forming tooth, and sees no reason to believe that there is any change in the supply to the formed tooth. Dr. Hunt claims also that the human tooth has often more than one foramen. The lecture was illustrated by a magic lantern and was full of original ideas and new and novel points.

Dr. W. X. Sudduth then closed the evening's session by a lecture, also illustrated by the magic lantern, devoted to tumors of the mouth.

At the final meeting of the National Association of Dental Faculties the following officers were chosen: President, Dr. L. D. Carpenter, Atlanta, Ga.; Vice-President, Dr. W. H. Evans, St. Louis, Mo.; Secretary, Dr. J. D. Patterson, Kansas City, Mo.; Treasurer, Dr. A. H. Smith, Cincinnati, Ohio.

Fourth Day's Proceedings.

The fourth day's proceedings of the American Dental Association were held at the Excelsior Springs, Mo., Opera-House, Friday, August 8, the newly elected president, Dr. A. W. Harlan, of Chicago, Ill., in the chair.

The committee appointed to arrange for the Dental Congress at Chicago in 1893 elected as permanent officers, Dr. W. W. Walker, of New York, president; Dr. A. O. Hunt, of Iowa City, Iowa, secretary; and Dr. Marshall, of Chicago, Ill., treasurer.

A resolution of thanks to President Foster and the retiring officers was unanimously adopted.

Dr. C. N. Peirce, of Philadelphia, moved a reconsideration of the vote upon the communication of the S. S. White Dental Manufacturing Company. Dr. J. N. Crouse, of Chicago, Ill., explained that the reconsideration was intended for the purpose of striking out all of the report except the conclusion arrived at by the committee in the summing up. The objection was raised that only a few members of the Association were present, and that a reconsideration at this time would probably call forth considerable criticism from those not present. The motion was lost.

A resolution was offered instructing the Executive Committee to send out circulars to the local societies for the purpose of increasing the interest in the work of the American Dental Protective Association. The resolution was adopted.

A resolution was read by Dr. Patterson, of Kansas City, Mo., to the effect that the committee of three appointed to investigate the

merits of the recent decisions of the New Hampshire Supreme Court affecting dental boards be instructed to see that the case is properly defended in the courts, and authorized to draw on the treasury to the extent of \$500.

Dr. Crouse, of Chicago, Ill., on behalf of the American Dental Protective Association, wanted the president authorized to appoint members of the Association to the vacancies whenever they occur in the committee having this matter in charge. A motion to this effect was carried without opposition.

Dr. L. Jack, of Philadelphia, and Dr. J. Y. Crawford, of Nashville, Tenn., presented a resolution to the effect that a board of business managers be selected to fix the place of the next meeting and perfect arrangements of a general nature. This resolution was decided to be out of order, and that the matter could only be reached by an amendment to the constitution.

Dr. M. L. Rhein, of New York, referred briefly to the paper presented to Section 7 by Dr. Hugenschmidt, of Paris, France, after which the section was passed. Section 4 was also passed, and Dr. W. B. Ames, of Chicago, Ill., presented the report for Section 1. This section is devoted to prosthetic dentistry, chemistry, and metallurgy. Dr. Ames is the secretary of the section and he reported two papers, one by Dr. C. S. Case, of Jackson, Mich., and the other by Dr. E. P. Brown, of New York.

Dr. Case, of Jackson, Mich., addressed the convention upon a system for constructing front crowns.

For the incisor and cuspid teeth, the root is cut off and trimmed as for an old-style wood-pivot tooth; a collar is then made in the usual way, except that it is left broad enough to extend to the cutting edge of the crown. The labial and palatal surfaces of this collar are then cut away in such a manner as to leave a cone-shaped projection on the approximal surfaces to the cutting-edge of the teeth. Into this collar a plate of gold is bent and soldered, making a cap over the end of the root. This is then placed in position on the root and a pin adjusted into the root-canal, if desired, the tooth ground to place and backed with thin platinum and a stiffer gold backing, and the whole cemented together with hard wax. It is then removed from the root, invested, and just enough solder used to attach the pin and tooth to the collar. An impression of the lingual surface of a corresponding natural tooth is then obtained in moldine and a die made of fusible alloy, with which a gold face is obtained, which is fitted and soldered to the lingual surface of the crown, producing a very artistic result. If desired, instead of

swedging the lingual face, it may be made with solder at the time when the pin and porcelain are soldered to the collar, but this takes more material and does not produce so artistic a finish.

For bicuspid and molars the roots are cut off square with a bevel on the labial side extending beneath the gum margin. The collar is made in the same manner as for an all-gold Richmond crown. The buccal surface is cut out and as much of the piece used as is necessary to extend over the end of the root to the pulp-canal. This piece is burnished down to the bevelled part of the root and soldered to the collar, furnishing a shoulder upon which the porcelain facing is to rest. The facing is backed and fitted to place and a pin for the root-canal, if desired, adjusted and the whole soldered as described above. The top of the collar and facing are ground off, and a cap swedged, in the usual manner for bridge-work, and soldered. This makes a crown that economizes material, time, and labor in the construction of a bicuspid tooth. It also makes it easy to insert pins into the root-canals, thus securing a more stable setting.

Dr. Case, instead of using platinum backing to cause the solder to flow under the porcelain tooth to make a close joint, uses jewellers' white enamel, which he places in the joint and under the backing, and when the soldering is done it fuses and makes an impervious case.

Dr. P. S. Brown, of New York, described a new form of porcelain crown, the benefit derived consisting chiefly in the shape of the pin, which is round or oval instead of square.

Dr. D. R. Stubblefield, of Nashville, Tenn., then addressed the convention on "Amalgamation and Dental Amalgams."

The speaker reviewed the history of amalgamation, the compounding of one or more metals with mercury. The discoverer of amalgams is unknown. Theophrastus, 300 B.C., seems to have been the first to mention mercury. He calls it liquid silver, from which we get quicksilver. Pliny, in the middle of the first century, mentions that all things float in it except gold, and that alone combines with it. From that time we find statements more or less definite, showing that the knowledge of the solvent power of mercury upon other metals was a laboratory tradition. Dr. Stubblefield then called attention to the experiments of amalgamation, the manner and methods of conducting heat, and the electrical conductivity of amalgams.

The different amalgams, as far as known, are crystalline in structure, and it may be that, instead of dissolving in mercury as

salt does in water,—*i.e.*, by the breaking down of the molecule,—the mercury disintegrates the alloy to nothing smaller than the crystal unit, so that when the mass is squeezed through chamois leather the crystal units which have collected in masses of sufficient size cannot pass through the pores of the skin, while the smaller masses and the single crystals are readily forced out.

The history of amalgam from the stand-point of the dentist is not so old. Many of those present will doubtless recall its earliest advent. I have been unable to obtain any authentic account of its first discoverer or the one who presented it first to us. Filing silver coins for us, in this way seems to have constituted the first alloy devoted to it, and yet at this early state no idea of preparing special alloys for the purpose seems to have entered into any mind. At first not only was the use of it looked upon with suspicion, but there was actual enmity and outright opposition. Whether the precarious existence was the cause of something else I do not know, but everything in this connection was vague and uncertain. Those who dared to use it felt guilty, and, like Peter, were ashamed and ready to swear that they did not know it, much less use it, when confronted by the accusation. It was a sort of moonshine business throughout, and the great wonder is that it survived such powerful and indiscriminating persecution. For a long time nothing could be known of its qualities, and if there did not exist the law in nature called the survival of the fittest it would be known to-day only as a tradition, only as a folly that died a natural death. But such is not the case. It has asserted itself, so to speak, in the very teeth of its defamers, and holds to-day a more or less conspicuous place in every office in the land.

The speaker then reviewed the relative merits of the different combinations of tin, silver, gold, platinum, copper, and zinc. In concluding, he said, "I merely wish to say that there are cavities in certain mouths that, from the very nature of the disabilities under which the operator must labor, can better be filled with plastics than anything else. My plea for the material is based upon the fact that it has never had a fair chance. It was born under adverse circumstances and under unpropitious skies, and it was at once relegated in effect, if not in fact, to the kitchen and the scullion. It was not used nor recognized by the most expert operators, and when it was tolerated it was merely to begin an unequal fight for existence as the custodian of a tooth 'not worth anything so expensive as gold.' It has been sneered at and scoffed at since its earliest hour, and yet, like another 'ugly duckling,' it has survived

disgrace, and I think the day is not far off when the best and the deftest will hail it as the truest and best friend when the need is sorest. Give it a trial. It is being given a show at last, a fair trial almost everywhere and by everybody, and it will yet convince the most sceptical that it has qualities that render it valuable in many places. A year ago in Galveston I was taught that it was excellent for filling the canals of pulpless teeth. Since that time I have used it carefully, and I am glad to say with better success than anything else I ever used as a root-filling. Dr. Miller, of Berlin, in his tabulated statement of the relative germicide power of the various filling materials, puts copper amalgam at the head. If this is so, and if in root-canals we desire aseptic power present, it seems to stand to reason that the practice is good. At any rate, I state it as true that it has been my friend for the past year in such cases."

Dr. J. Taft, of Cincinnati, Ohio, chairman of the Committee on Necrology presented a report upon the death of Homer Judd, of St. Louis, a member of the Association for years. The resolutions expressed regret at the loss to the profession and the Association of so valued a member, and contained a message of condolence to the bereaved family.

Dr. Truman requested permission to make some additions to the memorial of Dr. Homer Judd, as there were some facts connected with his life-work that he desired to procure and which were not at his command when he prepared it for the committee. The request was, on motion, complied with.

At the close of the session, Friday morning, the convention adjourned. A number of the members of the Association remained at the Elms until Monday, others made an excursion to the Rocky Mountains and the Pacific Coast, but the great majority returned to their homes and their offices well pleased with the Excelsior Springs convention.

NEW JERSEY STATE DENTAL SOCIETY.—TWENTIETH ANNUAL SESSION.

(Continued from page 125.)

Professor Charles Mayr.—I have listened with very much pleasure to the reading of Dr. William Trueman's paper and the remarks of Dr. James Truman upon it, and although I am not a practising dentist, I was once consulted by a well-known practitioner

in regard to the case of a lady, about thirty-five years of age, in whose mouth the entire surface of the lower and upper incisors were gone. I could not explain the case satisfactorily. There lingered in my mind a suspicion that it might have been a case of polishing and embellishing the teeth until they were too far destroyed. It was then nine o'clock in the morning, but I used some litmus paper, which showed the presence of a non-volatile action around the lips. The surface was very hard, a circumstance which can be very well explained, and being an intellectual lady, she was no doubt fond of talking, and the polishing of course was more active for that reason. I suggested that it might be good to have a kind of a mat for the teeth,—that is, some kind of a coat fitting over them made of some material which would prevent the action of acid upon them, so that in the mean time the diseased condition might cease. I do not know whether that suggestion was followed, but it appeared to me at that time to be the best solution. Perhaps some of you gentlemen may know how to utilize such a suggestion. Dr. Truman no doubt has the right idea. I merely suggested it as a kind of protective cap in the hope that, in the mean time, the tooth would not lose any more, but might possibly regain a little.

Dr. Trueman used the expression that it would be "reasonable to suppose" that certain things would be. I have very great respect for laboratory investigations, and am very far from depreciating them at all, but in science, in my opinion, there is nothing that is "reasonable to suppose." You cannot suppose anything; you must have your actual facts; and then, if you make a supposition (whether it is reasonable or not is immaterial), follow it out and work on the facts, and see if they harmonize; whether it is reasonable that they should or not is to me indifferent. So I think any tendency to supposing is very detrimental to your progress. Experiments made in the dentist's chair are far more valuable than those made in the laboratory. A dentist can collect a thousand facts before we can get in the laboratory a single case of proof. When decay is produced in a laboratory experiment, I do not consider that true decay; it is only an appearance of decay. Just as you can have an apparently perfectly good two-dollar bill manufactured in Jersey City by some enterprising Italians, but it is not a true note; thus it is with laboratory experiments. I consider anything done in the dentist's chair far superior to anything done in the laboratory. The dentist has to observe, and we can only compare the results, and so I think that Dr. Truman is ahead of the chemists and the biologists in his investigation.

Professor Peirce.—I listened to the paper of Dr. William H. Truman with a great deal of interest, and was glad to follow him in his distinctions as he commenced to read the paper, and was sorry afterwards that he lost that distinction and blended the conditions, which he first described, as the result of one force. We sometimes can learn from the lower animals, and those of you who are familiar with the mouth of a horse know very well that the incisors have deep depressions in the centre, and we judge of the age of the animal as those teeth wear, and at a certain age all the concave space is blotted out by attrition or worn away. That is a very admirable illustration of what I should call abrasion, and it is exactly the thing which takes place in the human mouth during a period of years where, by the mastication of food, the teeth are abraded or worn down. That may or may not be influenced by the secretions of the mouth. It takes place without any acid secretions in a thoroughly neutral or alkaline mouth. Again, we meet with depressions or grooves on the neck of the tooth where the gum has receded and the brush in cleansing comes in contact with the cementum; this is a case of abrasion with or without the acid, simply the result of the friction of a brush on that soft tissue. This is what I call abrasion and not erosion.

Professor James Truman.—How do you know that a brush produced the grooves?

Professor Peirce.—In this case I know for this reason: I said to the patient, "You use your brush vigorously and you brush around the mouth, for on the right-hand side of the mouth the teeth are worn considerably, and on the other side not so much; there the grooves are very slight indeed." There is always a difference in the condition of such mouths on the right- and left-hand sides, because the patient uses the brush more vigorously with the right hand, although, if the patient is left-handed, we have the deeper grooves on the other side. I draw these conclusions from the fact that the grooves, where they have been produced by the use of the brush, have been found in that condition. And then there may or may not be some acid process. Therefore I call that abrasion.

I have said that we have the incisors worn off by abrasion. Let us follow that a little farther, and we may have a case where that destruction has gone on so far that when the teeth are closed there is a space between the incisors that the handle of a tooth-brush could be placed in. If the papillæ on the tongue are tested in the morning, we will invariably find an acid condition. Now let us

take the crescent-shaped spaces that we so frequently see on the incisors. This may extend two-thirds of the way across the surface of the tooth and may be in depth the sixteenth of an inch. These crescent-shaped spaces arise from acid secretions in certain glands in the lips, and this acidity is due to a certain condition of the glands because, where we notice these cavities, we invariably find the patient belongs to a gouty diathesis. I do not say that in all persons belonging to a gouty diathesis such conditions will always be produced. I have examined the mouths of three young ladies who have the spaces described, all of whom belong to a gouty diathesis, and one is so troubled by it that she is oftentimes confined to her room from the effect of this inherited condition. The other two are entirely free from this disease, but their teeth are nevertheless covered with the crescent-shaped spaces, and I have lined the entire surface of some of the teeth with gold, while on others not more than one-third of the labial surface of the tooth is gone. Sometimes I have taken litmus paper and laid it over the tooth and ascertained the locality as nearly as possible, and then have pinched those glands with my small plyers, irritated them and applied carbolic acid and iodine, and have quite modified the effect. I am satisfied that the destruction is due to a certain condition of the glands in that locality, and that, oftentimes, is quite limited.

I fully concur in the statements of Professor Truman regarding the acid effect. It may be asked whether it is a decay. It is a destruction from an acid condition; it is not caries, because the abrasion of the lip has kept it smooth, and we do not have any accumulation of the organic matter there; that has been swept away with the brush or by the friction of the lips, and yet we have all the results of the acid, and we should have absolute caries were it not for the friction of the brush and the lip, which continually removes the organic matter.

One word, however, as to a point made in Dr. William Trueman's paper. He spoke of the friction, which he called attrition, between the bicuspid and molars in the teeth of people advanced in years, and thought that it was the cause of a caries which is observed oftentimes to attack the teeth after a period of fifteen or twenty years of entire absence of decay, and is more pronounced between fifty-five and sixty years of age. We are all familiar with the fact that we may have caries in early life, then a period of little or no destruction of tissue, and then, at the age mentioned, the surface of the tooth is attacked and the destruction goes on rapidly. I do not believe that friction has anything to do with the progress of

decay in that locality. I believe it is due entirely to the fact that with the teeth there is a natural wasting of tissue and a waning of the continuity which has formerly existed between the organic and inorganic matter of the tooth, and from the fact of the change of organic structure in advancing years the lime-walls are rapidly dissolved and carried away, and thus we have the loss of tissue manifested.

He also alluded to the peculiar adaptation of the molars and bicuspsids to each other, and attributed the depression of the one and the bulging of the other—their fitting so closely together—to attrition. The fact must be remembered that, though the teeth are dense, there is a possibility of displacement or rearrangement of the molecular structures.

Dr. William H. Trueman.—I don't know that I have anything further to add excepting to say that the paper was and is intended to be simply suggestive. In regard to the use of prepared chalk, I have been prescribing it for years on young patients, and have done so with a great deal of success. I have no doubt that in young persons it will do a great deal of good. I have also prescribed it for years in cases of erosion, but have not in a single case found it to be of the slightest effect. There was always a question whether the patient faithfully used it as directed to do; but in a number of cases I have no reason to doubt it has been used conscientiously and constantly and continued for years. I have seen no cessation of the erosion during its application, nor have I seen any effect when they have ceased to use it. In my opinion there is very little absolutely fixed on this question as yet, but if erosion is due to a changing condition of the secretions I would hardly expect the prepared chalk to neutralize the acid. The probability is that the destructive agent (if it be an acid, which it may or may not be) is generated in contact with the teeth, and it probably just as readily acts upon the teeth as it would upon the carbonate of lime, and will be neutralized in that way.

Some years ago Dr. Register read a paper on "The Use of the Atomizer in the Mouth for Cleansing the Teeth," which impressed me very favorably. The apparatus he used was very useful. Within a few months my attention has been called to this arrangement (exhibiting apparatus), which is very inexpensive, costing only seventy-five cents. I think a wash might be used very well with this. It is possible that this might produce some systemic disturbance, but with an instrument of this kind a very small amount of fluid can be brought in direct contact with the tissues

of the mouth. This is simply suggestive; I have not used it long enough to pronounce any opinion upon it.

On motion, the paper of Dr. Trueman was passed.

Adjourned until Thursday, July 17, at 10 o'clock A.M.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular monthly meeting of the American Academy of Dental Science was held in the Boston Medical Library Association rooms, December 3, 1890.

President Seabury in the chair.

The paper of the evening was read by Dr. George F. Eames; subject, "The Obtunding of Sensitive Dentine." (For Dr. Eames's paper, see page 158.)

Dr. Fillebrown.—I have been much interested in the paper, My experience with hot air or cold spray has not been extensive, and this because the experience which I have had with them has not been very favorable. Their application has inflicted too much pain. This is the case with other obtundents, as phosphoric acid, and in particular chloride of zinc. These generally produce considerable pain, but are effective. With cocaine I have had more uniform and satisfactory success than with any other substance I have used. I have had marked successes with it in many cases where one would think it would hardly accomplish anything,—for instance, in buccal or labial cavities where the rubber dam is not applied, but a napkin is laid upon the gum and the cavity made moderately dry. In these cases, without the use of alcohol or hot air for drying, but simply by removing moisture with absorbent cotton, and laying on a piece of cotton saturated with cocaine and allowing it to remain for a minute or two, a wonderful change takes place. The patients themselves will notice it and speak of it. It will not always palliate, but it will do so in a larger proportion of cases than any other agent that I have ever used. I wish also to say amen to the use of the anæsthetic power of ether for obtunding sensitive dentine. I have patients who for a long time have used it whenever they have had an operation performed, and they will not allow me to do anything to their teeth until they get their dose of ether. By taking it to the first stage of anæsthesia, I can cut away and get the teeth into good shape, and the patients do not suffer at all. But for the prejudice against ether on the part of so many patients,

I would use it a great deal oftener than I do. If it were not for the prejudice that exists against chloroform, I would use it instead of ether. Chloroform has a pleasant odor, and a very small quantity is effective. Its vapor has not the irritating quality of ether vapor, and it will obtund the sensitiveness of dentine with a less degree of anæsthesia than will ether. I have one patient, a dentist, for whom I have performed operations for a number of years. His teeth are very sensitive indeed, and he invariably takes a little chloroform on a napkin and inhales it; and while he is still conscious and perfectly rational, and can talk and tell me what is going on, he can have the operation performed with perfect ease. I think this matter is worth our attention. The method is perfectly reasonable, and I wish more would try it. Recently I underwent a minor surgical operation. In order not to feel the pain, I took some chloroform on a napkin and inhaled it until I felt all right, and then said to the operator to go ahead. I retained my senses and held control of the chloroform and of myself. I knew what was going on, talked about it all the while, and told the operator that he was not hurting me. The operation was soon over, and I felt all right in a few minutes. I think the inhalation of anæsthetics to obtund sensitive dentine a practical idea to entertain, and it is worth our while to give it more attention.

Dr. Williams.—There are several points in the paper with which I fully agree. I was glad to hear the rationale of the sensitiveness of dentine so thoroughly elucidated. The matter of obtunding sensitive dentine of course comes to us in a practical way. Some time, perhaps, I will allude in a paper to a system I devised for obtunding sensitive dentine before ether was used. It was not a complicated or dangerous process. It consisted in allowing a simple solution of chloride of lime to remain a short time in the cavity. Then with a sharp instrument, and the sharpness of the instrument was an important factor, you could cut where you could not touch before. This method I have used to a considerable extent since. For the general obtunding of sensitive dentine I have found lime-water effective. Bicarbonate of soda often does the same thing, though more disagreeable to the taste. If patients will simply rinse the mouth with dilute lime-water, not strong enough to be caustic, it is a good application to sensitive dentine.

Speaking of ether, my preceptor, Dr. Keep, was rather intimately connected with some of its promoters, and I had an opportunity to see how it was received by the public. At first it was used

very extensively ; patients demanded it,—they thought that the day of the millennium had come, that they could take ether while undergoing any operation and be free from all discomfort. There were two or three who insisted on taking ether at once as soon as they sat down, before having the teeth examined, to be unconscious of what was needed to be done. Of course there were very great objections to that, and we often had to use strong argument to convince them that it was not wise to use it so freely. When I opened an office of my own, I discarded ether largely because of the disagreeable odor in the office, which I carried out in my clothes, and which patients carried around with them for several days after it was used. In some cases, too, nausea was produced, which was objectionable.

When chloroform began to be substituted for ether, one or more cases at the hospital resulted fatally, and I have no doubt that if we had not by habit been so very careful in the application of sulphuric ether in Dr. Keep's office, there would have been fatal results from the use of chloroform. We had several cases of collapse, in which there was cessation of breathing in some instances and cessation of heart-beat in others, and at times it was only by the greatest vigilance that we succeeded in bringing such cases around, and most of them were not the result of a heavy dose. I remember one case as showing the idiosyncrasy of some constitutions with regard to the influence of ether. A lady was overcome by ether which was merely unstopped in a bottle six or eight feet from her,—the simple "intimation" of the odor checked the circulation. That, of course, was an unusual thing. I remember a scare which one of our older physicians had in my office. His brother was a patient of mine, and required the extraction of two or three roots which were rather irritating, and he proposed to take ether. They were using chloric ether at that time as a modification of chloroform, and the patient asked if he might have his brother come in and give it to him. I said certainly, I should be very glad to have him relieve me of that part of the care. So the physician gave it, and a few seconds after the extraction the patient collapsed. He fell back and ceased to breathe, his eyes were glazed, and he grew purple in the face, and no pulse could be felt. The physician turned as pale as the brother was purple, and called for ammonia. I told him there was no time for that, there was not a second to be lost, we must get him to breathing *at once*, and I commenced the bellows action of the chest and kept it up steadily, not even stopping to put him into position for working the arms. Very soon his face began to brighten, and

he recovered. There is a value to this bellows action, I think, that is not often apprehended. No time should be lost,—not even to get your appliances; the action of breathing forces the heart to act so that the circulation is not fatally stopped.

I agree that aside from these there are other ways of obtunding sensitive dentine, and the use of cocaine, of which the essayist speaks so highly, certainly is of great value. I think that it has been with me the most satisfactory ready obtundent I have used, although I have been disappointed in some cases of very dense dentine. Even those cases generally would be affected; and instead of giving three or four minutes for it to take effect, I would seal up the cocaine in the cavity and go on with some other work for ten or fifteen minutes or more. Sometimes in applying it to the outside of a tooth, I put a piece of paraffine paper over it to prevent its washing away, and let it rest. Time renders the application more effective. In its application to soft dentine, by mixing the cocaine with lanoline or agnine its absorption is facilitated.

Dr. Eddy.—In connection with this topic I should like to show one of Mr. Small's latest appliances. I do not approve of chloroform; I think it is liable to be fatal, and I do not like ether on account of its odor. This instrument is an improvement over the "steam cooker," as Dr. Cooke calls it, which was shown here at one of our previous meetings. It is much smaller than the old one, and is more easy to handle. It consists of a little cylinder containing a cartridge into which is put some cotton saturated with alcohol. This rubber tube is simply intended to keep the heat from the hands. By heating the bulb here the hot air vaporizes the alcohol, and you get a spray of hot alcohol vapor from this point. As there is no lamp with it there is no danger of any explosion. Mr. Small brought it to me about two months ago, and I have used it somewhat, perhaps not as much as I would wish.

Dr. Cooke.—Is Mr. Small selling those appliances?

Dr. Eddy.—I understand he is; I believe the price is fifteen dollars.

Dr. Cooke.—I saw in one of the British journals lately an illustration of an appliance just like that. It was shown in Berlin by a Mr. Simonis before one of the societies there, the price being a few shillings.

Dr. Banfield.—I would like to ask Dr. Eddy if there is anything to make them so expensive?

Dr. Eddy.—Not in the material or cost of manufacturing. I should think thirty-five or forty cents ought to make it.

Dr. Briggs.—I am very much interested in this paper and have obtained several suggestions from it. I simply want to testify to the method by which I obtund sensitive dentine, which has something of the same principle as the essayist advocates. I first obtund the sensitiveness somewhat with a solution of cocaine, and then follow that with a mixture of carbolic acid and caustic potash to destroy the contents of the tubuli. This treatment is very effective.

Referring to the remarks on ether and chloroform, I think we ought always, in speaking of a subject of that sort to those who have not made a special study of their use, to caution them that they are attended with considerable danger,—especially chloroform. I do not use ether because the odor is so very bad. I have used chloroform many times as spoken of here to-night, but I wish to give to others the very strong caution to remember that the state of incomplete anæsthesia is considered the most dangerous state the patient can be in. At that time the heart is slightly enfeebled by the action of the anæsthetic, and if you cause sufficient pain you may by reflex action stop the heart entirely. So that the state of incomplete anæsthesia is more dangerous than the complete state, where the danger is not to the heart, but to the respiration, the heart beating for several minutes after breathing has ceased, and a prompt means of continuing respiration generally restoring the patient. It is, therefore, important to bear in mind these facts when deciding as to whether you will put a person under complete or incomplete anæsthesia, although ordinarily the pain from a tooth is not sufficient to cause reflex action.

Dr. Williams.—From my observations I think Dr. Briggs's remarks would apply to chloroform rather than to sulphuric ether. My experience with the use of partial anæsthesia has been confined to sulphuric ether, and I have found that it gives the patient a sort of "Dutch courage." I sometimes used it in light operations, as the taking out a small root, and have never had any trouble in its use while producing partial anæsthesia. With chloroform I have seen rather dangerous threatenings.

Dr. Niles.—There seems to be in the profession a general attention to the subject of sensitive dentine. During the past year five or six improved methods and secret preparations have been advertised or presented to us in one way or another. I am of the opinion, however, that the restrictions of sale are such that professional honor precludes many from using them. The appliance which has been shown here to-night I have been somewhat connected

with, and perhaps it is best for me to explain just how I am interested in it.

Last spring, as you know, an appliance was exhibited here which was called the "steam cooker." I experimented with it and met with very fair results, but it was very clumsy and unmanageable. I think it was the first instrument of this kind that Mr. Small made. He afterwards made this modification of the appliance, which he brought to me just as I was about to start for Berlin. He desired me to take the appliance along with me. I asked him how he intended to put it on the market. He told me that he had decided to sell them outright at a fair price, also stating that it was patented in America, France, and England, but not in Germany. It was my opinion, and I think I so expressed it to him, that, if the instrument would do what he claimed for it, the profession would be willing to pay him a fair price—at least ten dollars apiece—for the instruments, but that they would not take hold of them at one hundred, fifty, or even twenty-five dollars, as he proposed. I had only a few moments for conversation with him, and he left to my judgment the sale of the instrument in Germany. After showing the apparatus in Berlin, I was invited to clinic. I did so for three consecutive days, and met with extraordinary success; in no case did it fail of the desired result. I had seven patients, all dentists but one, and all of them assured me that they did not experience the least pain in its use, or in the excavating following its use. It was received with a good deal of enthusiasm; thirty-two or thirty-three gentlemen were anxious to be supplied with them at once. Acting upon the instructions which the inventor gave me before leaving this city, I made arrangements with a dental friend in Belgium to fill orders at ten dollars a piece, forty marks. These orders were filled and the inventor approved my action. I have recently learned that, on account of there being no patent on the invention in Germany, the instrument has been reproduced by manufacturers there so as to be sold for six marks. I would not care to use the instrument nor recommend it if its price were one hundred dollars, or if dentists were to get an instrument free by taking a share of stock in the company. In my opinion, it is as unprofessional to rob the inventor as it is to permit him to rob us by encouraging an exorbitant price. I think he is entitled to some credit for having invented the appliance, and that ten dollars is not a high price for it. If we use the invention, the inventor should be paid. I use the instrument almost daily, and am very much pleased with it. It is not always successful; a great deal depends upon the den-

sity of the dentine. But in the teeth of children, if kept dry, it acts very quickly and effectively. With adult teeth the action is slower, and often produces considerable pain before the sensitiveness of the dentine is controlled. An application of a few seconds is often all that is necessary to produce complete insensibility to pain in very sensitive teeth.

Dr. Ainsworth.—I should like to ask Dr. Niles if in the use of this instrument or the one that preceded it he has ever had any unpleasant results on the pulp?

Dr. Niles.—I have never used it where a tooth was decayed near the pulp, and have never seen any bad results, or known of any, from the use of this instrument.

Dr. Ainsworth.—It strikes me that this is a great improvement over the other. I used the other instrument a few times, but with very little satisfaction, and I was informed of a case where there was a good deal of trouble apparently from over-cooking the pulp. That happened at a clinic, but it seems to me this instrument could be handled more easily, and would therefore be free from as much danger.

Dr. Eames.—In regard to the steam obtunder exhibited by Dr. Niles, I have not heard it stated here just what it is that obtunds. I suppose, however, its virtue is wholly due to the temperature established in the dentinal fibrils. I have a jeweller's blow-pipe about eight inches long that acts on identically the same principle as the instrument shown here this evening. There is a wick saturated with alcohol enclosed in the pipe. If you heat one end of the tube, the vapor comes forth in a jet. I see nothing new in principle, simply a new use of the principle.

I have the pleasure, through the courtesy of Messrs. Codman & Shurtleff, of showing you their new compressed air-tank, the instrument to which I referred in my paper, and by means of which we can have air on tap at any desired temperature. Here is the air-pump with two cylinders and a gauge. Any desired pressure can be obtained, and just by the touch of the finger the air can be let out at the syringe-pointed nozzle. The air is not warmed in these cylinders, but in a separate air-tight tank connected with this. I did not bring that with me to-night, as I have not had time to complete certain improvements that I am making in it. In order to secure a favorable condition for the absorption of cocaine in the hard, dense teeth of elderly persons, I use more of the warm air. I had a case this afternoon where I used warm air exclusively with good effect, applying a continuous stream for a considerable time.

Dr. Briggs.—Would it be possible to warm the air in the tank?

Dr. Eames.—Yes, but if you use a very long tube, especially a rubber tube, the air will get cool before it reaches the end, and you do not have the same temperature as in the tank.

Dr. Briggs.—Does it not require a pretty large chamber, so as not to allow the air to cool?

Dr. Eames.—Not so large as I at first supposed. A tank the size of a quart is sufficient. I could let air very rapidly into the tank through an orifice a quarter of an inch in diameter, and it would become heated as fast as it entered. Small metal tubing heated at one point will warm the air sufficiently, even though the air passes rapidly through it.

Dr. Fillebrown.—At what temperature do you use the air?

Dr. Eames.—In view of the theory that I have advanced, 105° Fahrenheit should give the best results.

Dr. Fillebrown.—I have been using for a long time cocaine and chloroform separately, but I should think that a solution of cocaine in chloroform might answer the purpose just as well.

Dr. Eames.—A ten-per-cent. solution makes a very good mixture, and is fairly clear, as you will see by the bottle I have just passed around. I have used this solution only a few times; I am in the habit of using warm air to quite an extent, raising the temperature of the tooth and removing moisture from the dentine. I then use absolute alcohol and then dry the tooth. I next apply the solution of cocaine, and afterwards apply chloroform on cotton to hasten the absorption of the cocaine. This process to be repeated when necessary.

With regard to the state of partial anæsthesia being a condition of danger, it does seem a reasonable conclusion when we remember that the nucleus of the fifth nerve and the nucleus of the pneumogastric are very closely connected. A peripheral injury, therefore, referred to the fifth may be transmitted to the cardiac branch of the pneumogastric and paralyze the heart. Still I have used partial anæsthesia very generally, and have never had any serious results.

As to the injection of cocaine into gum-tissue, to obtain good results these are the requisites: A sharp needle and a good syringe. Inject the solution with considerable force until the tissue turns perfectly white for a considerable distance about the tooth. When this effect is produced in every case the tooth can be removed without pain.

Dr. Briggs.—May I ask Dr. Eames how much he injects, and of what strength?

Dr. Eames.—Of a four-per-cent. solution I usually use from five to ten minims, and a proportionate amount of the stronger solutions; that is, upon the average patient. There are those who may be susceptible to a less quantity. In the injection of cocaine into gum-tissue I am mindful of these facts: The dose by the stomach is one-eighth grain to three grains; under the skin, two minims of a four-per-cent. solution. In injecting into the gum, however, much is wasted and some is probably carried off by the hemorrhage which follows. We may therefore expect that a comparatively small portion of the dose enters the circulation. It would be a far different matter if the needle should go below the gum into the vascular tissues at the junction of the cheek. In such a case a very sudden and profound effect might be experienced. Provided the whole amount were sure to go into the circulation, two minims of a four-per-cent. solution should be enough for the first injection, in case the patient has never had it used before.

Dr. Briggs.—I got constitutional effects the other day from a twenty-per-cent. solution of cocaine passed down around the root of a molar tooth that I wished to scale thoroughly, not using the hypodermic syringe, but simply bathing around the root. The patient seemed to be very susceptible, but of course that is a somewhat stronger solution than one would inject.

Dr. Williams.—Cocaine is one of those things that seem to act differently on different constitutions. You cannot make a machine thing of it,—cannot always calculate what the effect will be.

Dr. Eames.—I would suggest that every one should know the physiological antagonist of cocaine. Nitrite of amyl is the antidote. The best form for use is the pearls, which are little glass capsules, and are simply broken, crushed in a handkerchief, and inhaled. No one should use cocaine without having the antidote at hand.

President Seabury.—I would say that, for the last six years at least, I have been using for sensitive dentine, especially in the teeth of children, a little atomizer with which I spray ether. I feel sure that I can take up my atomizer and obtund the sensitiveness of the tooth and excavate it and get through while you are getting these things ready. In my hands it is very uniform. A half-minute's application of the spray of common sulphuric ether into a cavity is very effective. You have the atomizer right at hand; use it and get through with it, and that's the end of it.

Dr. Brackett.—Do you use an ordinary atomizer such as you would use for perfumery, operated by an elastic bulb?

President Seabury.—Yes; direct it right into the cavity and spray it there for, say, half a minute, put it down, take up your excavator, and cut off that sensitive layer. It can be used with or without the rubber dam.

Dr. Stevens.—I should think the ether would be likely to dissolve the rubber dam.

President Seabury.—I haven't noticed that it does; it would hardly do it in so short a time.

Dr. Taft.—In excavating around the gums in labial cavities, on the incisors, for instance, you would not use it without protecting the gum, would you? Would it not freeze the gum?

President Seabury.—I never freeze the gum. If the margin of the gum begins to turn white I stop,—that is enough. You need not have as much as that, even; it hasn't to be carried to that extent. Any man who uses it will become familiar with it and know exactly when to stop. My rule was, when I first began to use it, to apply it until I saw the margin of the gum begin to turn white; but now, where I do that once, I use it ten times without, and with as much uniformity of result as in any other operation. The beauty of it to me is that it is quickly done and over with.

Subject passed.

Dr. Eddy.—I have here a very neat blow-pipe which I found in a jeweller's supply store. I bought it of the Waterbury Brass Company, Providence, and presume some of the jeweller's supply stores here have it. Price, \$2.50.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

HARVARD ODONTOLOGICAL SOCIETY.

DISCUSSION OF DR. STANTON'S PAPER.

(For Dr. Stanton's paper, see page 163.)

Dr. Briggs.—Mr. President, I recall a remark which I made at the last meeting,—viz., that the pulps which I capped were not exposed pulps; in other words, they were pulps that would have been exposed if I had removed all of the softened dentine. I dressed them with a mixture that would not harden, simply oxide of zinc mixed with an antiseptic, making as deep a layer of that as the cavity would

bear, then put over that a piece of copper metal, very thin, serving, I believed, two purposes,—one, that it relieved the pulp from the pressure of the oxyphosphate, which I put on later; the other, that it had some antiseptic virtue of its own. That is the only kind of exposed pulp that I have capped. I never attempt to cap those pulps that are actually exposed, because in most cases that I have seen that “layer” gets injured, and the result is the death at some future time of the pulp, either through the formation of pulp-stones or inflammation of that organ. In some cases death may not take place until after five or ten years have passed. The trouble is then generally very serious and hard to control. In my opinion, the better way, if the tooth be fully developed at the time, is to destroy the pulp, and then make a successful filling of the root, and you will then have a very serviceable tooth. It is a very interesting point that Dr. Stanton has brought out.

Dr. Taft.—I should like to ask Dr. Stanton if he knows whether, in an inflammatory condition of the pulp, the cells of the odontoblastic layer take on a different appearance from what they have in a normal condition?

Dr. Stanton.—That is an extremely difficult question to answer. When you consider that the odontoblasts have to be magnified from eighteen hundred to three thousand diameters in order to be clearly distinguished, it is evidently very difficult to note any change of appearance. Again, it is likely that in the preparation they will be destroyed.

Dr. Taft.—Then, how do you know that those cells are destroyed when anything of an escharotic nature is put on? Isn't it merely theoretical knowledge?

Dr. Stanton.—Possibly, to a certain extent,—but inasmuch as all thoroughly exposed pulps are destroyed, it is fair to presume that this is because the odontoblasts cannot perform their work. Perhaps I do not make the point very clear, since my paper was hurriedly written, but my idea is that the irritation of deep cavities, with large fillings, and the pressure of clasps, such as are used for the correction of irregularities, or as supports in bridge-work, do, in time, paralyze the odontoblastic layer and prevent a subsequent deposit of lime; and it is, furthermore, fair to presume that, as soon as the functions are interfered with so that they cannot free themselves of the lime, we get the destruction of the pulp through the formation of pulp-stones or from inflammation. We all know that when a pulp is inflamed it swells. If there is no room to allow for that swelling, the pulp and nerve become constricted at the apex

and it is very easy to see what the result will be. A microscopical examination of the pulp shows that it is little more than embryonic tissue, the only regular organizations found are these odontoblasts on the surface and the circulating blood-vessels. There are no lymphatics in the pulp, you will remember,—in fact, it is the only tissue in the body that has no lymphatics; that being the case, there is no aid to the repair of injured tissue. And then, if you destroy the layer of odontoblasts, there is nothing underneath to reproduce them as there is in the case of the skin.

Dr. Briggs.—It goes without saying that this layer is destroyed, or at least deeply injured, when we apply escharotics to it. The treatment is certainly not conducive to the repair of injured tissue.

Dr. Stanton.—The fibril which enters the dentine is quite as strong as the other two which extend, the one to the deeper tissue of the pulp, the other to the neighboring odontoblasts, and in removing that softened tissue, of which *Dr. Briggs* speaks, you are likely to remove the layer of odontoblasts with the layer of dentine, because you cannot discern it with the naked eye; that being the case, you have destroyed the only organ of the pulp that can restore it to its healthy condition.

Dr. Hitchcock.—I should like to ask *Dr. Briggs* if an escharotic will work through and destroy the odontoblasts when used over that softened tissue?

Dr. Briggs.—I grant you there is a possibility of its working through provided the layer is too thin.

Dr. Hitchcock.—Then you would leave a fairly thick layer of that softened dentine?

Dr. Briggs.—I should consider all those things as treatments and should not leave them indefinitely. I should look upon them as something having the nature of a promissory note, to be endorsed in the course of a year at most, the dressing is all to be removed, and then a little more of the dentine taken away if it still is soft, the tooth dressed again in the same manner, and left for another year or two; after the second dressing, if everything seemed to be in as good condition as when I first saw the tooth, I would put in a permanent filling.

Dr. Taft.—The inflammatory condition being a diseased condition, the cells of the odontoblastic layer must undergo changes as in other tissues. I admit that this layer of cells is destroyed under cappings of an escharotic nature, but I also believe that it is destroyed under cappings which are not of that nature.

Dr. Stanton.—If a pulp has been irritated to the extent of

sloughing, the result should be the same as in other tissues. If an irritation of the skin, even though it be superficial, should be sufficient to cause sloughing, the cells there are destroyed. It is an extremely fine point,—you might almost call it hypothetical, but it is not an unreasonable one.

Dr. Taft.—There seems to be great diversity in pulps as regards the way in which they will recover after they have been capped. A patient came to my office the other day, and referring to one of the bicuspid, which had been treated some time ago by a prominent dentist, remarked that when it was capped the pulp bled very profusely, but that pulp is alive to-day under the capping and has been perfectly comfortable ever since it was capped. I rarely attempt to cap a pulp that has been bleeding, and if I do it is after the hemorrhage has somewhat abated. Why shouldn't the odontoblastic layer in this case be destroyed almost immediately? It must have been in a high state of irritation.

Dr. Stanton.—Not necessarily. There are many wounds which heal without the slightest irritation and leave no scar whatever? There is a difference between a wound produced by a sharp, clean cut, and one which is the result of the diseased function of any organ. Some pulps have a greater power of recovery than others, just as there are persons whose flesh heals with wonderful rapidity and ease.

Dr. Briggs.—I think Dr. Smith said at the last meeting, Mr. President, that the best class of cases to treat were accidental exposures. He said there was no excuse for making them, but I believe some of the members said they did occur. Speaking of the difference in the recuperative power of pulps, some pulps do not give the cry when they are dying that others do. They seem to have the power of repressing their complaint, and a pulp may be dying slowly and surely, and it is not until it is dead and begun to slough, and we have an alveolar abscess, that signs of its death appear.

Dr. Hitchcock.—At the school Dr. Moffatt instructed us to perforate the pulp, letting out a drop or two of blood to relieve the inflammation, the chances being far more favorable for its recovery. The case which Dr. Taft speaks about is one of those which was benefited by the letting of blood.

Dr. Taft.—Yes, but you rarely have inflammation with a freshly-exposed pulp. Why should there be any need of perforating a pulp where there has been no inflammation?

Dr. Hitchcock.—Simply working over the tooth is likely to pro-

duce inflammation. You can realize this in operations requiring considerable excavation, where the cavity extends near the pulp, as it often causes soreness.

Dr. Gillett.—The case which Dr. Taft cites of a bleeding pulp being capped and, on being examined a year afterwards, found to be apparently performing its functions, recalled to my mind several cases of this kind, and I will mention one in particular, which will serve to illustrate the condition that a pulp may get into and still be apparently healthy. A lady under my care for the past four years has had for all of that time in a left lower molar a gutta-percha filling, which has been gradually wearing out. Quite lately I concluded that the filling was so much worn as to need repairing, so I re-excavated the cavity. As I removed the last of the filling a drop of pus spurted out from the bottom of the cavity; I was surprised, as I had not expected to find any trouble whatever. That filling had been in the mouth for at least five years. The pulp was evidently exposed at the time the filling was made, but the tooth has been comfortable, has given no trouble whatever during the time it has been under my care, and the pulp was apparently a healthy one. On looking into the cavity, after removing the filling, I could see that beating or throbbing that you occasionally find in a violently-inflamed pulp, and it gave every indication of being badly diseased. There was an absence of pain about it that you sometimes meet with in those cases. I mention this as an illustration of what irritation a pulp will bear and go on apparently performing its normal functions, but still becoming more and more diseased, while to any examination which can be made short of actually exposing it, it is apparently as healthy as any other pulp.

Dr. Upham.—Some writers have stated that the pulp is not only a formative organ, but is also destructive,—that is, the pulp, through the fibrils of its odontoblasts removes, by osmosis, lime-salts from the dentine. I should like to ask Dr. Stanton the function of the odontoblasts in this respect.

Dr. Stanton.—My paper is very likely to be criticised, and in all probability will be in the matter of my reference to the layer of odontoblasts as a membrane. Some writers deny that it is or can be classed as such. I have never read of the statement that Dr. Upham has just made, and therefore do not feel prepared to answer the question intelligently. I should like to ask him if he means that this is supposed to occur in a normal, healthy tooth?

Dr. Upham.—The statement applies to a state of general malnutrition induced by illness, disease, a low vitality. The teeth are

said to be robbed of their constituent lime-salts, rendering them more liable to decay. I do not think this theory a true one, but do think, in view of the facts shown by most recent demonstrations, that the enemies immediately causing decay of the teeth are to be found in their environment.

Dr. Stanton.—The pulp is, to a great extent, the remains of an embryonic organ; by another stretch of the imagination you may regard the odontoblastic cells as the remnants of an embryonic cell. It is well known that in the formation of the adult tissue all over the body there is a return to the embryonic state before the permanent condition is formed; in other words, there are embryonic cells which, to a certain extent, go to the formation of tissue; but, before they reach perfection, there is a reaction, and these cells, instead of attaining completeness, take on a reformative action and proceed to form the adult tissue until the type limitation has been reached. Now, it is perfectly possible that the odontoblastic cells may be of this nature. It is perfectly well known that the osteoblasts, or bone-formers, will be converted into osteoclasts, or bone-destroyers, under certain conditions; that is, the very cells that are the depositors of bone will be converted into the cells that absorb the bone-tissue in case anything interferes with their action. In a normal condition I doubt very much if that can be so. The younger the tooth is, the larger is the pulp; the farther away you get from the pulp, the smaller is the fibril, until ultimately you have no fibrils whatever, and the pulp, instead of destroying the dentine by removing the lime-salts, becomes entirely ossified, and there is no pulp-canal or cavity.

I will speak of an experiment which I read, which consisted of feeding a female dog, during the period of gestation, on food which contained absolutely no lime-salts, no bone-forming constituents. The dog's health remained perfectly good, and, on the birth of the pups, one of them was immediately killed and the bony structure thoroughly examined to find out if any disease had been promoted through lack of nourishment. There was none discovered whatever. Other litters of pups from the same dog were examined, and though she was continually fed on food containing no lime-salts, the pups were perfectly formed and gave no evidence of a diseased condition. Finally, the female dog was killed and every part was examined; the bones were all right except those in the spinal column. There was a very decided wasting away of the vertebræ.

Dr. Briggs.—It is a very interesting point, that question of the rise and fall of the tooth with regard to its quality. It seems to

me that the teeth do undergo changes and at some times are harder or softer than at others. How the deterioration and restoration is produced is of course what we would all like to know. This last experiment which Dr. Stanton has spoken of is interesting because I remember that in the former doctrine there was a theory—I don't know how far it has ever been carried out—that it was possible to effect painless labor by giving the mother food containing no lime-salts, whereby it was presumed that the bony system of the child would not develop until after birth, and the child, being simply a mass of flesh and cartilage, would be born with greater ease. The experiment which Dr. Stanton cites goes to prove that the child has the first claim, and the mother's bones have to give up their lime-salts to insure its development, and if there is a dearth of this material the mother suffers most largely in that direction.

H. L. UPHAM, D.M.D.,

Editor Harvard Odontological Society.

Editorial.

HAVE WE A CODE OF ETHICS?

THE constant allusion to a code of ethical laws governing the dental profession has for many years led to the inquiry, Is this supposed code a written set of rules, authorized by and prepared under the supervision of a recognized representative body, or is it simply a collection of moral statutes that should govern individual and all large bodies engaged in a common occupation? The search for an authority in the matter has failed to show any such authorized code. The only one extant at the present time, as far as known, is that adopted by the American Dental Association, August, 1866, which was, doubtless, copied and modified to suit conditions from that of the American Medical Association. This, while excellent in itself, has no binding power, as the authority from which it emanated was not then, nor has it ever been a truly representative organization, and hence could not speak authoritatively on this important matter. Local societies have in various places adopted rules for the government of their members which, while valuable in a restrictive sense, possess no general influence on the profession.

Rules are but the expression of mental growth, and, whether applied to individuals or societies, exhibit only the progress made in moral elevation, and while suitable for one period may not meet all the needs of an ever-growing present or the ethical extensions required for the future.

It may be said, Why formulate rules at all? Why not leave this to the ever-indwelling consciousness of right and wrong in the individual? The answer must be found in the fact that agreement upon such a basis is impossible, and in the end confusion will be the legitimate result. While laws are always unsatisfactory and an abridgment of personal liberty, it seems necessary to have them for good government and for the orderly arrangement of many minds into something akin to unity. If this be true, it seems that the time is ripe for a readjustment of this so-called code. If the American Dental Association changes its character to a truly representative body, a change possible and probable in the near future, one of its first duties should be to arrange the ethical status of the profession in the United States.

The thought that led to this has been the constant violation of what may be regarded as duties each and all owe to every member of a common calling. It has been apparent in many ways and has led to bickering and estrangement in certain circles where only harmony should exist. It is unnecessary to point out in detail these sins of commission and, we may say, omission, for oftentimes an individual is injured as much by silence as by more pronounced speech. This fact must be apparent to all readers of dental journals. It is not unusual to find papers received with favor in societies where all the ideas and, oftentimes, modes of treatment are bodily incorporated, and no attempt made at reference to the originator. The wrong of such a procedure is obvious and works injury not only to those who have laboriously performed original work, but to the person adopting it, for such laxity of morals is always double-acting in its effects, and ends in the debasement of the individual. Much of this trouble might be avoided by a close following of the golden rule; but this, unfortunately, is rarely done.

We have had in many places proper discussions on patents and the rights of dentists under the patent laws and the relation of such to the code; but little or nothing is heard of that deeper and more dangerous enemy to our peace, insidious attacks by anonymous writers intended to undermine influence, and which frequently accomplish not only this but the destruction of hard-earned reputations. It is time that the thinly-veiled venom displayed in letters to the dental periodicals should be discountenanced by editors and readers.

In the absence of a code of authority, can we not substitute the higher law to deal justly by all men and meet them upon all occasions with a broad and generous spirit, and with an earnest effort to arrive at the truth without fear of an open assault, on the one hand, or of a craven stabbing in the dark, on the other?

INDEPENDENT DENTAL JOURNALISM AND ITS USE.

THE employment of the term *independent* as applied to dental journalism has excited opposition and criticism from the moment of its adoption. Why is this? Why is it that a term which when used in connection with general journalism means freedom of expression of thought should excite when it comes to be applied to an organ of dental opinion a feeling of antagonism?

The argument is used that because a professedly independent

organ requires for its existence an income derived from subscribers and advertisers, and is also liable to suffer in these resources by the adverse opinion of its readers, that, therefore, it can have no claim to independence. If that were the restriction of the value of the word the criticism would have force.

In this sense it is true that every man who employs his muscle or his brain to secure the means to support his physical life is dependent. But he may be deprived for a time of all that makes life agreeable and yet maintain throughout that independence of mind which constitutes true manliness. He will be free to think what is true and do what is best, and in this intelligent age the result of this kind of independence must come out victorious.

It is this manliness applied to the needs of the dental profession that is required, and it is this quality which independent journalism claims to hold.

While dependent for sustenance upon its patrons, like an individual man, it stands on higher ground. It views our profession, or our specialty, as many call it, with distinctiveness of character and of organization. It finds a body of at least twenty thousand active intelligent members without a current literature of its own to furnish opportunity for the full expression of such views as are favorable to the growth of the higher sentiments which should be under development in so large a body of men.

So forcible and general is this sentiment that no distinct class will rest long without some form of leadership of opinion and without some medium that will incline to raise the general mass above the influence of the meaner instincts which are connected with the pursuit of wordly existence. After supplying the current knowledge of science, of facts, and of procedures relating to our special work, independent journals should have as their chief end the stimulation of those impulses which tend to develop professional spirit. However faint the expression may be, however slight the influence at first may appear, the movement of arousing the sentiment of solidarity will go on, and the undermining influences which it is too plain have been leading to the decay of true professional life will die out.

The higher effort of raising the aims of the dental worker above those things pertaining to the lower elements of his calling to those which concern his mental growth and the cultivated breadth of which his specialty is capable belongs to that form of dental literature which will grow up through the care of journals published under the control of practising dentists.

It is for these reasons that this journal, which is the outcome of the deeply-seated sentiment that dentistry needed to have its literature under its own control, espouses the cause of the kind of independent journalism above delineated, and calls upon dentists everywhere to support any effort to foster a periodical literature which is liberal in tone and independent in spirit.

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ANNUAL MEETING OF THE DENTAL PROTECTIVE ASSOCIATION.

THE report of the annual meeting of this Association will be found on another page. This is satisfactory, showing that the profession is generally being aroused to the importance of the subject. The amount of energy that Dr. Crouse has devoted to this should stimulate to corresponding efforts on the part of those equally interested.

It will be observed that the statement is made that they have "driven the Tooth Crown Company from Milwaukee, and that a suit has been commenced in New York, and that answers will be filed in time." The report also claims that the Association has saved one million dollars to the dental profession in the past year.

Notwithstanding the very extended notices issued of the aims and objects of this Association, there is still a want of definite legal knowledge on the part of dentists in regard to it, and as a consequence much bad feeling has been engendered. Whether this is the fault of individuals or of the Protective Association it is difficult to determine; but the fact remains that many are still in doubt, especially those who have heretofore worked under a license. Some means should be taken to clear up the latter question.

BIBLIOGRAPHY.

CATCHING'S COMPENDIUM OF PRACTICAL DENTISTRY FOR 1890. By B. H. Catching, D.D.S., Editor and Publisher, Atlanta, Ga.

This work has been looked forward to with much interest, as it seemed to promise to fill a place in dental literature at once important and necessary, both to the busy practitioner and to the student.

The labor required to collate facts is one of the serious duties of editorship, and to the conscientious writer it is of vital consequence to be sure of his authorities. This labor Dr. Catching has tried to lessen. That he has measurably succeeded in this must be conceded.

No one unfamiliar with this kind of work can realize the patience required to secure and condense facts that nothing of real value is omitted.. It is an almost impossible task.

In the preface the editor says, "In this labor I have been guided by nothing but a desire to benefit dentistry." Those who know Dr. Catching personally are quite well aware that this is absolutely true, and in this effort he has had the sympathy and, as far as possible, the co-operation of the best elements in the dental profession.

The collector of such a body of facts cannot, in the nature of his subject, be responsible for the originality of the quotations. He is necessarily obliged to accept them as found. The collection will, however, be the means for comparison, and will have a value not thought of by the compiler, of enabling original workers to detect the literary piracy becoming most disagreeably prevalent in our profession.

The items selected for quotation would have greater value if they had in addition to the names the number of the journal from which they were taken. As the compendium is at present arranged it may lead to error and to credit where credit does not belong.

This defect does not interfere with its value to the practical man, who naturally has no interest in searching for the origin of things, but has in the new idea that will help him in his daily work. For such a person the condensed form adopted for this book will be a permanent and ever present friend.

In the stress of work thrown on the editor in this compilation there has, unfortunately, been some lack of attention to details, resulting in errors which will doubtless be corrected in future editions. Errors in spelling of proper names are frequent.

As a compendium is one of the books greatly needed in our profession, we hope the editor will be sustained in the effort. The value of a summary of each year's work in the profession, a condensed form always at hand for ready reference, can hardly be over estimated. The excerpts should be judiciously pruned of all unnecessary verbiage and all false assumptions. This done, no work would be of more value in the library. With the experience obtained in this first attempt and the evidence given of ability in this direction, we have no doubt but that the present editor will supply this demand in future editions.

THE DENTAL LABORATORY: A MANUAL OF GOLD- AND SILVER-PLATE WORK FOR DENTAL SUBSTITUTES, CROWNS, ETC., TO WHICH IS ADDED MANIPULATIONS IN VULCANITE AND CELLULOID, ETC. By Theodore F. Chupein, D.D.S. Published by Johnson & Lund, Philadelphia, 1890.

This work of one hundred and twenty pages, by Dr. Chupein, contains in a condensed form more valuable practical suggestions than in some similar volumes of a more pretentious character. It has been written by one closely familiar with the details of laboratory practice for many years. The name of the author became familiar to the older workers in dentistry through his valuable contributions, and it is pleasant to find that he has not lost in the intervening years the love for mechanical work, so much neglected and so little appreciated by a certain class in the profession. He has, therefore, performed a valuable service in giving his experience a permanent form.

The author commences very properly with the consideration of metal work, the knowledge of which was almost lost upon the introduction of the rubber base; but which, happily, is becoming again part of the daily experience of students in the preparation of "crown and bridge" substitutes.

To these the suggestions and clear descriptions contained in this book will be of great aid, as it has been prepared with the view to meet all the minor difficulties likely to be met with by the beginner.

The author has shown a remarkable ability to place himself in the position of the student, and enters into the details of manipulation with an enthusiasm most commendable. For the lack of this practical attention to details, many of the works of prosthetic dentistry have failed to meet the needs of the beginner, for it is in trifles that he will encounter his greatest difficulties.

The volume is clearly and properly illustrated, and it can cordially be recommended to every young practitioner as the book to keep on his laboratory table for ready reference until the subject is mastered.

UEBER DIE BEHANDLUNG CARIÖSER APPROXIMALFLÄCHEN AN MOLAREN UND BICUSPIDATEN. VON DR. THEODOR FRICK. Zurich.

This is the paper mentioned in the proceedings of the Swiss Odontological Society in the February number. It is an excellent statement of the treatment of approximal cavities, and fully in accord with modern dental thought and practice.

Foreign Correspondence.

NEW METHOD OF PREPARING GLASS INLAYS.

TO THE EDITOR:

In the November number of the *INTERNATIONAL DENTAL JOURNAL* I observe an article by Dr. Bruce, of Melbourne, on the Herbst method of glass inlaying.

Recently, when in America, I had the good fortune to see some beautiful specimens of inlay work, which had been sent over by Dr. Bruce from Germany to a mutual friend in Philadelphia. These were accompanied by a short description that differed in some points from the published one. On my return to Europe, I was induced, by what I had seen in Philadelphia, to try this method, but failed to get anything to please me; but after reading Dr. Bruce's paper in your November number, I renewed my attempts at glass-inlaying and with very satisfactory results. The method I have adopted differs in some details from that of Dr. Bruce and seems simpler and quicker, while the results are equally good. It is chiefly a combination of the methods of Drs. Herbst and Reichter, and is as follows:

The cavity is prepared without undercuts and lined with a piece of No. 60 gold-foil, which is pressed to place by means of small hard balls of cotton-wool; thus a sharp impression of the cavity is got, but if a sharper one be wished a burnisher may be employed, care being taken to anneal often. This is then carefully removed and the resulting matrix about half filled with the glass powder made into a paste with distilled water. The matrix is then held by one corner with a pair of foil-forceps and the glass carefully dried over an ordinary alcohol lamp and fused; more of the paste is added and the operation repeated till the cavity is full. After each firing cracks from shrinkage will be seen in the fused glass, but after the third addition of the paste these will have disappeared. After allowing it to cool, the gold is stripped off and the inlay is ready to set in the tooth. If too full, it can be ground down with fine corundum wheels, followed by Arkansas stones and moose-hide points, with pumice powder and water, which leave the inlay with a fine gloss. I sometimes mix the glass with alcohol

instead of distilled water; by its use the powdered glass is less likely to spark when heated.

Those who have adopted the Herbst and Reichter methods will appreciate the saving in time and trouble of non-investment, as well as the further advantage of cutting and polishing the inlay after it is set in the tooth.

JOHN GIRDWOOD, L.D.S., D.D.S.

65 QUEEN STREET, EDINBURGH.

Domestic Correspondence.

TO THE EDITOR:

SIR,—Please allow me a word in regard to the electric deposit-plate. Mr. E. E. Clark, the owner and manager, has been absent in the West in its interest most of the year, and I have, in his absence, undertaken to look after the making of the plates. For a considerable time past, the plates have been sadly deficient in gold, sometimes not enough being put on to properly vulcanize over.

I was unable to account for it, knowing that full quantity of gold was supplied. The secret has been discovered, and the person accused of using the gold furnished to him for coating the plates is now in jail awaiting trial for larceny.

The plates as now made are all right in every respect, and it is hoped that all its former friends will again come back to its use.

Yours, etc.,

C. S. STOCKTON.

NEWARK, November 17, 1890.

Current News.

COMPLIMENTARY BANQUET TO THE VETERANS OF THE DENTAL PROFESSION.

THIS banquet, which attracted wide attention on account of its novelty, took place at the time appointed. The announcement was recognized as a graceful tribute to the fathers of the profession, and met with a response of generous feeling in many sections of the country.

The attendance was an unusual one, both in numbers and character, Boston, Chicago, Washington, Philadelphia, and other places furnishing representatives to do honor to the men and the occasion. The large banqueting hall was filled, one hundred and seventy-five being seated.

The following veterans accepted and were present: Dr. John B. Rich, Washington, D. C.; Dr. Jesse C. Green, West Chester, Pa.; Dr. Spencer Roberts, Philadelphia; Dr. C. A. Kingsbury, Philadelphia; Dr. J. J. Wetherbee, Boston; Dr. F. H. Burras, Long Island; Dr. W. B. Hurd, Long Island; Dr. A. D. Newell, New Jersey; Dr. J. Hayhurst, New Jersey; Dr. Jere. A. Robinson, Michigan; Dr. A. J. Volek, Baltimore; Dr. John Allen, New York; Dr. W. H. Atkinson, New York; Dr. W. H. Dwinelle, New York; Dr. S. A. Main, New York; Dr. L. S. Straw, Newburg, N. Y.

The following accepted, but were detained: Dr. Elisha G. Tucker, Boston; Dr. Ambrose Lawrence, Boston; Dr. Finley Hunt, Washington; Dr. W. H. H. Thackston, Virginia; Dr. Augustus W. Brown, New York; Dr. C. W. Spaulding, St. Louis.

The following, for various reasons, declined: Dr. Edward Maynard, Washington, D. C.; Dr. Edwin J. Dunning, Newton Centre, Mass.; Dr. J. DeHaven White, Philadelphia; Dr. Daniel Neall, Philadelphia; Dr. Edward Townsend, Philadelphia; Dr. R. C. Marshall, Maryland; Dr. J. Smith Dodge, Morristown, N. J.; Dr. A. W. Kingsley, New Jersey; Dr. J. F. Fowler, Florida; Dr. J. H. Farnsworth, Detroit; Dr. Corydon Palmer, Warren, Ohio; Dr. L. N. Bristol, Lockport, N. Y.; Dr. E. D. Fuller, Peekskill, N. Y.; Dr. B. W. Franklin, Ithaca, N. Y.; Dr. W. A. Royce, Middletown, N. Y.

Dr. Norman W. Kingsley presided, and in a pleasant, witty speech called attention to the supposed origin of the respected guests and to the fact that the ranks of these fathers in the profession were being rapidly depleted, and that it was our duty as it was our pleasure to honor them while they were still with us.

The committee had only been able to find forty who were in practice fifty years ago; but had heard of some few others since the invitations were sent out, but of this number, forty, one-half, were here to-night. He then referred to the few in Europe, and humorously alluded to the difficulties which might be encountered with the McKinley Bill in importing material that possibly might interfere with home production. He then called on Dr. Marvin, of Brooklyn, to welcome the guests.

Dr. Marvin said, "I have been invited to speak a few words to

you fathers on dentistry. In obedience to an invitation, you have left your homes to partake of our hospitality and give us an opportunity to see how men look and act who have practised dentistry for half a century.

"I am but voicing the sentiment of my own heart in tendering you this earnest welcome, and in this testimony every one present is a sharer. We meet you as men of mature years, whose judgments have been proven in the many communities in which you have labored. We meet you as pioneers in a profession when its literature was weak; when its methods were crude; when nearly all that goes to make up the profession, as now understood, was absent. As veterans who have come down through all these intervening years of struggle, we welcome you.

"We welcome you for the reason that you have freely contributed all you possessed of professional knowledge for the instruction of the neophyte as well as those further advanced. We welcome you in that you have advanced the literature of the profession, and we give you more than all glad welcome and extend our congratulations that you have lived to see this happy day. And now may the sea of life flow smoothly, respected fathers, and as you have done your share to give honor to the profession, we do well to honor you. Bear with you the assurance of our earnest hope for a continued future of that usefulness so well demonstrated in the past. Let us now all rise, and with fervor respond to the sentiment, 'Our Fathers in Dentistry.'"

The President then dealt humorously with the supposed antiquity of the guests, and called on Dr. Hurd, of Brooklyn, N. Y., whose vigorous tones and mental quickness gave no signs of loss of power. His speech in response to that portion of the President's remarks in relation to the Ark was most excellently done, and called forth the plaudits in unreserved measure. Having disposed of the worthy presiding officer, he said,—

"Brethren, time has changed us, and this is more apparent to others than to ourselves, as we cordially greet each other in the old familiar tones. We met often in the past when the fires burned more brightly than now; but I know you are not willing to say or to feel that you are only burnt embers.

"To-night we have been highly honored. We have had good things said to us through the eloquent lips of Dr. Marvin. The proper man was selected to give the veterans the right hand of welcome. How applicable to him, it seemed to me, were the words of the dying girl,—'I am almost there, mother.'

"To you, young men, let me say, I wish you to get all the good possible from your profession. It is a noble one. Build your castles while in your youth, and we, the old men of the profession, will reflect and rejoice that the day's work is almost done."

It would be pleasant to give full abstracts from the remarks of the other speakers, but space will not permit further extension.

Dr. F. H. Burras spoke of his early experiences, and was followed by Dr. Rich, of Washington, formerly of New York, who paid a just and glowing tribute to the work of Dr. Hayden. Probably no other man present could speak of these earlier pioneers from more thorough personal knowledge, and his remarks bridged over the present to the past, and vividly pictured the men of the transition stage from empiricism to professional worth.

Dr. Sheppard, of Boston, made some interesting remarks on the life-work of Dr. Tucker, of Boston, who, though eighty-three years of age, has a clientele the very best, and performs his labor with a hand as sure and eyesight unimpaired as thirty years ago.

Dr. C. A. Kingsbury, of Philadelphia; Dr. J. J. Wetherbee, of Boston; Dr. W. H. Dwinelle and Dr. John Allen, of New York, and Dr. S. S. Straw, of Newburg, N. Y., made appropriate and interesting remarks.

Letters were read from Dr. J. Smith Dodge, Dr. Edward Maynard, Dr. Edwin J. Dunning, Dr. C. W. Spaulding, Dr. Elisha G. Tucker, and Dr. R. C. Mackall.

A telegram was received from Chicago, presenting compliments to the "Old Guard" and regrets at not being able to be present.

At the President's request, the company arose and sang "Auld Lang Syne," and, with good wishes for the veterans, departed for their several homes, carrying with them the memory of a pleasant reunion.

PITTSBURG, PA.

The annual meeting of the Odontographic Society convened in the parlor of Library Hall, January 22, 1891. The following officers were elected for the ensuing year: President, F. S. Whitslar; First Vice-President, W. F. Fundenberg; Second Vice-President, W. A. Kessler; Secretary, W. H. Fundenberg; Treasurer, W. A. Lee; Librarian, H. L. Reinecke.

Censors.—J. S. Goshorn, C. J. Phillips, L. Depuy.

Executive Committee.—W. F. Fundenberg, George Shidle, C. B. Bratt.

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Original Communications.¹

CREOLIN.²

BY DR. WM. H. POTTER.

ALL antiseptic drugs are of interest to the dentist. Though there are several antiseptics whose reliable qualities have been thoroughly proven, yet each one possesses one or more serious defects. Hence it is that we look forward to each new antiseptic with the hope that it may possess all the advantages of the old drugs, and none of their disadvantages. The claim has been made that creolin is an improvement over carbolic acid, corrosive sublimate, or iodoform, which constitute our most important antiseptic drugs. In order to judge, if possible, of the value of this claim, I have undertaken to study the literature of the subject, and examine evidence for and against this new preparation.

One and one-half creolin, according to the analysis of Professor H. B. Hill, of the Howard Medical School, is a mixture of the sodium salts of some resinous acids with the part of oil of tar known as "irod oil." He thinks the sodium salts are probably what is known as "Harzeife," a resin soap. The oil contains a small amount of

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the American Academy of Dental Science, Boston, October 8, 1890.

carbolic or cresylic acid according to Dr. Hill. Other observers report the absence of any trace of carbolic acid. Pearson & Co., of Hamburg, who offer it in the market, give the following analysis :

	Per cent.
Neutral hydrocarbonates.....	66.
Phenols (without carbolic acid).....	27.4
Organic bases.....	2.2
Ash.....	4.4
	<hr/> 100.00

Creolin is made from English pit-coal by distillation, and is of brownish-black color, and syrupy consistency. It is not a definite chemical compound, but a mixture of various ingredients. It is insoluble in water, but quickly forms with it a brownish or milky emulsion. It also mixes with oil and glycerine. In absolute and ninety-five-per-cent. alcohol it is soluble in all proportions ; also in chloroform and ether. It is non-volatile.

Creolin was mainly used in veterinary medicine previous to the year 1887. In that year its properties were investigated by Esmarch and Eisenberg, and by them the drug was brought to the notice of general practitioners.

According to Dr. Jessner,¹ the bacteriological works of Esmarch and Eisenberg show that a three-per-cent. solution of creolin equals a five-per-cent. solution of carbolic acid in antiseptic value.

The same observers² claim that a one-per-cent. solution of creolin retards the development of bacteria better than an equal strength of carbolic acid, and that a five-per-cent. solution of creolin destroys pathogenic bacteria.

Dr. Spaeth³ and others took daily doses of eight grammes of creolin for some time without experiencing any bad result. There was noticed decrease in intestinal gas, inodorous fæces, urine which remained a long time without undergoing ammoniacal fermentation. A patient of Dr. Korturn, by mistake took sixty grammes of creolin in five-per-cent. solution without bad result.

Esmarch experimented with decomposing material, the germs of Asiatic cholera, typhoid fever, anthrax. Creolin proved a more powerful germicide than carbolic acid, except in the case of the bacilli and spores of anthrax.

¹ *Therapeutic Gazette*, 1889, p. 830.

² *Ibid.*

³ *Medical News*, December 1, 1888.

At the beginning of the present year, the German opinions upon creolin are summed up in *Braithwaite's Retrospect*¹ as follows:

Dr. P. Baumgarten states that he has found it to be a strong animal poison and also an antiseptic, yet only in solutions of a strength that would be fatal to animal life.

Dr. Behring comes to the conclusion that creolin possesses antiseptic properties three or four times as weak as those of carbolic acid in solutions of equal strength. A two-per-cent. solution of creolin will not disinfect wounds. The drug is not so poisonous as carbolic acid.

Dr. Eisenberg states that he has found two-per-cent. to five-per-cent. solutions of creolin to be powerfully antiseptic, killing almost immediately streptococci, staphylococci, cholera bacilli, and other bacteria. Seidel and Hornicke agree with Eisenberg.

Hunermann, as the result of a long series of investigations, states that creolin has no right among antiseptics. It undoubtedly retards and in some cases even prevents the further growth of bacteria, but does not kill them. Dr. Kortum and Dr. Bunsen have tried the drug in obstetrical practice, and say that they have found it a most admirable antiseptic, not being so irritating as carbolic acid, and possessing styptic properties. For washing the vagina, Bunsen uses a one-half-per-cent. solution. Dr. Rausche highly lauds the deodorizing properties of creolin, and uses it as an application for burns, superficial wounds, etc.; he also advocates its use in form of soap for cleansing and deodorizing the hands. Drs. Amon and Prutscher have used a weak solution of creolin in optic and aural surgery to great advantage. From the references quoted it would seem pretty well established, in spite of some contradictory evidence, that creolin possesses decided germicidal power, and that in quantities liable to be used it is non-toxic. It has also proved to be a reliable hæmostatic and a powerful deodorant. It does not injure the hands or instruments. Having such qualities, it has come to be used advantageously in the ordinary routine of antiseptic surgery for disinfecting instruments and hands and for irrigating wounds; also in the treatment of inflammation of the ear and eye, in catarrhal conditions of the nose and pharynx, in cystitis, gonorrhœa, vaginitis, endometritis, and in the antiseptic treatment of labor. It is also efficacious in removing the odor of cancer and in the treatment of burns. Granting that creolin is an efficient germicide, it possesses advantages

¹ January, 1890, p. 243.

over carbolic acid. It does not roughen the hands, as does carbolic. The full strength of the drug can be put on the skin with impunity. It is practically non-poisonous, while carbolic is a violent poison, needing to be carefully guarded. It is more agreeable to mucous surfaces than is carbolic, tending to prevent excessive secretion and to reduce congestion. When compared with corrosive sublimate, it can be said to have the same advantages over it that it possesses over carbolic,—namely, in being non-toxic, non-irritating, non-depressing as regards mucous surfaces.

Dr. E. O. Otis¹ makes the statement that creolin combines the favorable workings of iodoform and corrosive sublimate.

The drug has, however, certain disadvantages, not the least of which is the fact that it is a secret preparation. Pearson & Co., of Hamburg, are the most reliable manufacturers, and they guarantee to keep the article up to standard strength and quality. And it has been proved by laboratory experiments that the virtue of the drug has been quite constantly maintained. The negative experiments, however, of certain observers might be explained by supposing some specimens of creolin to be less powerful than others. The opacity of creolin is a disadvantage, since it obscures instruments immersed in it, and hides surfaces under treatment. When an emulsion is allowed to stand, a gummy, resinous mass is precipitated, and this may adhere to instruments left in the fluid, making them sticky and difficult to clean. The faults of creolin are, however, not serious, and it is not surprising that the drug has entered into our dental materia medica. It is useful in several ways. First, as a mouth-wash. For this purpose one or two drops of creolin are added to half a tumblerful of water. The emulsion thus made is practically inexpensive. Four or five ounces of the drug, which is quite cheap, will furnish a mouth-wash three times a day for a year. Being a powerful deodorant, it corrects disagreeable odors connected with many well-known conditions of the teeth and mouth. Being a reliable germicide, it will at least hold in check the growth of acid-producing germs. Being non-poisonous, it can be prescribed freely and placed in the hands of patients without fear of untoward results. Its slightly astringent action upon mucous surfaces gives it a peculiar range of usefulness in soft and congested mouths. Its slightly alkaline reaction fits it to correct acid conditions, and, finally, and of no small consequence, its taste of a tarry nature is agreeable to most people. A second sphere of

¹ *Boston Medical and Surgical Journal*, August 9, 1888.

usefulness is in the treatment of fistulous tracts or any suppurating surface. In such cases it tends to diminish secretion and induce a healthy state of the tissues. It is also a good drug for root-canals. It will quickly deodorize a dead pulp, and it makes a reliable antiseptic for the subsequent treatment. If desirable, it can be mixed with alcohol in any proportion, and thus an antiseptic and drying action can be at once secured. In short, it can be used wherever we would use carbolic acid, except in cases where we wish to produce a cauterizing effect or relieve pain.

A minor use to which creolin may be put is that of taking rust off of instruments. To accomplish this the full strength should be used, and the instrument rubbed with a rough cloth or a piece of Faber's rubber and corundum ink eraser. A convenient way of using it is to apply to a felt laboratory wheel.

As to the strength of creolin solutions, a two-per-cent. is commonly used for instruments and hands, and a one-half to one-per-cent. for irrigation of wounds and treatment of mucous surfaces.

If any wish to read up on creolin, I would refer them to a very complete and carefully-written article by Dr. E. O. Otis, of Boston, printed in the *Boston Medical and Surgical Journal*, June 20, 1889.

In conclusion, let me say that though creolin promises to be a valuable drug, yet it is still quite new, and we must experiment carefully with it till its true place of usefulness is established. Meanwhile, we should not entirely abandon carbolic acid, corrosive sublimate, or any of the old drugs which have proved themselves efficient in our hands.

THE RETENTION OR REMOVAL OF THE SIXTH-YEAR MOLAR,—WHICH?¹

BY THEODORE F. CHUPEIN, PHILADELPHIA.

It is not the purpose to deny or affirm whether the sixth-year molar belongs to the temporary or the permanent denture, but it is the purpose to show that experience proves that its *timely* removal redounds to the benefit of the other teeth of the permanent set, and, in the large majority of instances, to the comfort of those we serve.

¹ Read before the Odontological Society of Pennsylvania, January 3, 1891.

It has proved itself to our satisfaction that if this tooth be removed in time, the two bicuspid, on each side and in each jaw, will not be in such close contact as to endanger their proximate surfaces by decay, those surfaces which give us such care, solicitude, anxiety, and trouble in our efforts to arrest caries when it has once gained a foothold. It has been demonstraed, in the large majority of cases, that removal at the proper age will induce the second or twelfth-year molar to work forward and occupy nearly the same place formerly occupied by the sixth-year molar, and this without tilting, leaning, or assuming the least malposition, and that both the second molar, as well as (subsequently) the wisdom tooth, will take normal positions in the jaw with a free, easy space between each, whereby decay on the proximate surfaces of these molars as well as the bicuspid is largely the exception rather than the rule.

It will be admitted by nearly all, if not by all, dentists that decay on the proximate surfaces of the bicuspid and the three molars are the localities, *par excellence*, that are frequently most prone to decay, and are the surfaces most difficult to combat.

All statistics prove that the sixth-year molar is the tooth which decays more frequently, and on all surfaces, than any tooth of the denture, and that, like a decayed peach in a basket of such fruit, it communicates caries, by contact, to its neighbor (if caries is communicable in teeth, which we do not advance), and thus spreads ruin among the good seed.

The sixth-year molar, in my opinion, is often the bane of the denture, the black sheep of the flock. After the most careful work and the utmost solicitude on the part of both patient and operator, failure to preserve it is the result. Or, if it be preserved, is the victory commensurate with the labor or the pain incident to such victory? Or, are after-results beneficial to the rest of the teeth? I say no!

The jaws of the present generation do not seem to be large enough for the accommodation of thirty-two teeth. Witness the large number of cases of irregularity of the teeth which we see in people of our time, when the jaws have to be spread or enlarged to accommodate the teeth, or where teeth have to be extracted in order to make room. If, then, we can secure a better condition of the denture by the removal of this tooth, what good reason can be advanced for its retention?

It has been asserted that the second molar will tilt, and thus give a malocclusion with its antagonistic teeth, if the sixth-year molar

be extracted; but such a result will not occur if its removal be made at the proper age or time.

It has been advanced that the proper comminution or trituration of food cannot be accomplished as well if the sixth-year molar be removed as it can when it is retained. Yet we very much doubt this position, when, by its retention, frequently all the proximo-masticating surfaces of all the posterior teeth are so largely occupied by fillings that these fillings cannot offer as good means of communication as if the teeth were in tact. Will it be contended that the proper trituration of food can be as well performed by teeth which are filled (however faithfully the contouring of such fillings restore the normal shape of the teeth) as it can be by genuine tooth-tissue? It has been asserted that if this tooth be extracted too soon it will cause an impairment of digestion; not only this, but, the bulk of mastication being thrown on the teeth anterior to it, this extraction will cause a change in the features of the patient, giving them an apish or bull-dog expression. It may be doubted whether such might be the case if the extraction were done too soon, but nothing is suggested of this kind. At the time it is advised to extract this tooth, all the eight bicuspids will be fully developed, and the patient will not be without a molar to chew on for more than six or eight months at the farthest. Such a change in the features as is intimated, and such an impairment of the digestive functions, could not be brought about in so short a time with eight good back teeth to chew on. Indeed, very many adult persons go through life with sometimes even fewer posterior teeth, and these never think of resorting to artificial grinders to assist in mastication, being quite able to do all their chewing with eight bicuspids or less, and no molars at all, and yet do not suffer from dyspepsia or have apish expressions of countenance. It must not be concluded that it is advised to extract the sixth-year molar as soon as it gives pain from the effects of decay; such is not the idea. When this tooth shows early signs of decay, it would be better that every means known be used for its preservation up to a certain time of life, after which I would advise its extraction in the large majority of cases. The time for the proper extraction of the sixth-year molar, it must be stated, cannot be set down to any specified time any more than the erupting of the teeth can be positively determined, some of these erupting earlier and some later, in different subjects; yet, ordinarily, from about the tenth and a half to the eleventh and a half year is near the period, the eleventh year most generally. I favor the extraction of these four teeth,

but am inclined to the belief that the extraction of the lower should precede that of the upper molars by from six to nine months, because the lower teeth frequently erupt before the upper ones. A very popular dental writer has stated that "the overcrowded condition of the teeth causes caries, imperfect mastication, incorrect enunciation, and deformity of feature." But while I quote this author in support of the position, it is not to offer his testimony as binding, except in the matter of one,—the "cause of caries,"—because I do not believe he referred to the crowded condition of the teeth except in so far as their malposition in the jaws was concerned. Yet I do hold that even in their regular position, when forced against each other in closer contact than is admissible from the size of the arch or intended by nature, such contact tends to, or is a most fruitful cause of, decay.

I do not wish to infer that decay is wholly due to close contact, for it is known that teeth which are widely separated are sometimes found with caries, and again, it may occur on surfaces that are never in contact, yet even when a tooth has begun to decay from contact with its neighbor, necessitating its removal, the decayed tooth seems, if not to assume a retrograde process, at least not to make as rapid progress in the consumption of tooth-tissue as it would have done had its neighbor been in place.

It will not be advanced that once a tooth has been filled it will not decay again. If such a consummation could be arrived at, it would be a joy indeed. It is the recurrence of caries after filling that makes the dentist seek the solution of the cause. This or that reason is advanced, most often the lack of thoroughness or faulty manipulation, yet the effect always remains. But whatever be its origin, the dentist must remedy the disaster, though he has to fill and refill again and again at each recurrence of decay.

When such proximo-masticating fillings increase in size at each recurrence, not only subjecting the patient to severe pain and strain in the preparation and filling, the dentist to great fatigue, the parent or relative to the payment of the fees these necessarily expensive operations entail, should not any means that promise the bringing about of different and improved results be adopted for humanity's sake? What is the use of continuing on a beaten track that does not lead quickly and most certainly to the coveted goal? And if the results, for the patient's benefit, can be brought about by the system advanced, is it not a duty we owe them to try it? And is it not often the case that the oft-repeated filling so demoralizes the patient that, in despair, rather than have the same thing

done again, they resort to wholesale extraction, and hang their hopes, despite every argument to the contrary by their dental adviser, in the substitution of artificial teeth?

But it may be advanced, "If such a condition could be brought about, what would become of the dentist's art? It is caries which dentistry has to combat, and principally in those teeth and those localities which furnish the bulk of employment in dentistry." I am sure that it is only those who are actuated by cupidity or mercenary motives who would bring forward an argument like this in rebuttal. Dentistry desires to be allied with medicine and surgery; but can an instance be shown where a physician has ever failed to advocate a measure that would point to or foster a system for the prevention of disease? May it not have been said that prevention of disease would bring about the downfall of medicine? Yet, did that prevent the noble Jenner and the equally noble Koch from promulgating their systems for the promotion or cure of small-pox and consumption? These diseases are wasting and tedious, and would naturally furnish a very large employment to the physician; but can human suffering and personal aggrandizement ever be placed in the balance?

I assure you I am in earnest in this matter, and have my patients' interests as much at heart as any man among you, and I feel sure that its performance will not only save the patient very many severe and painful operations, but the dentist severe and tiresome work.

The evidences of the truth of this position are to be seen in operations performed, of the like character, by other dentists, and in all cases seen benefit has resulted.

I present you an ideal case in the model sent around. You will perceive on one side of the mouth, where the sixth-year molar has been retained, how all the proximo-masticating surfaces of the teeth have been filled extensively, whereas, on the other side, where that tooth has been removed, how all the proximate surfaces have escaped decay. This is attributed to the freedom from close contact and the facility with which these surfaces can be kept clean with little trouble to the patient. It may be considered good theory from æsthetic grounds to retain the sixth-year molar, but I know it is good practice for our patients' comfort to remove it.

Is it not more reconcilable with common sense to save twenty-eight out of the thirty-two teeth which are given to man than to make the attempt to save the whole thirty-two and fail in the attempt? For is it not a failure, or next door to it, when (what-

ever may be the cause of the recurrence of decay) cavities, once filled, have to be refilled again and again in order to keep back the inroads of the insidious enemy?

Is it not more reasonable, and will it not be admitted, that the patients' interest, health, and comfort are better served, to say nothing of the operator's, when twenty-eight teeth are preserved, with only, perhaps, a few simple places filled, than to try to save the thirty-two, with such results as are observed in the large majority of cases? And would not any patient prefer to have this many teeth, almost, if not quite, intact, rather than thirty-two tumble-down crowns, half tooth and half gold, if the case were submitted to them? In a remarkably fine paper recently read before the Southern Dental Association by Dr. W. H. Atkinson, he uses the following language: "The highest use of any profession is to so instruct the people that they shall be in such healthful condition as not to demand a remedy. There is no reason why dentists should not be entirely competent to prevent disease more often than to treat it. The time has come when prevention is more important for them to turn their attention to than treatment." Who will not admit that he is a better physician who can prevent disease than he who can cure it? So that the old proverb of "an ounce of prevention is better than a pound of cure" is an acknowledged truth.

We could advance many arguments in further proof of our position, but we have said, perhaps, more than enough to set the matter before you, and therefore leave it for your consideration.

SOME ANCIENT THEORIES.

BY H. H. SCHUMANN, D.D.S., CHICAGO.

So much has appeared of late in the various dental journals in regard to the etiology of dental irregularities, that a few remarks in regard to some "theories" may not be out of place. I cannot understand why certain theories are constantly brought up again and again in dental societies, and valuable time lost in the discussion of things which ought not to need any further explanations. I want in these few lines simply to enumerate a few of the former theories in regard to this subject, and some of the reasons why I think them at present useless, doing this simply to enlighten a few

who seem not to have kept up with the times, so that the valuable few moments allowed in our meetings be not wasted in settling wild conclusions, and also to form a thread for discussion of a few unsettled questions.

Most authors satisfy themselves in their works on oral deformities by quoting a great number of appliances, both complicated and simple, and do not enter into theory very deeply, in that respect being far behind our professional brothers and writers abroad. I think if they would venture to apply their knowledge on this subject they would be far more valuable to the student and the profession in general. If a practitioner knows the cause, signs, and symptoms of mechanical conditions, it would, as a rule, be very easy for him to suggest means by which the disturbance could be remedied much easier, quicker, and surer than if he has to remember a lot of empirical measures, none of which usually will fit his particular case.

Dr. Eugene Talbot has written a book of only one hundred and fifty pages, but to my mind it conveys more practical knowledge than any book on dental deformities published up to date, no matter how large or how complete it may be; and I am of the opinion that his book gives all the practical knowledge necessary, simply because those few pages are saturated with good, sound, sensible ideas, and not with modes of treatment.

In enumerating the following theories, I will state, in the beginning, that, to my mind, those elucidated in the book mentioned are the clearest and most sensible ones, and based on more facts than any I know of.

Dr. Cartwright, many years past, wrote the first able article on etiology in England. It is true that most of the knowledge we have on this subject was given to the profession by English writers. Dr. Cartwright says correctly, in his paper, that irregularities of the teeth are not found in any of the aboriginal tribes, as the Japanese, Chinese, or African negroes; but he cannot account for the fact that it is found in the nobility of England. American authors have since explained this condition as being due to the non-observance of selective marriage; through intermarriage of blood relations the physiological powers of both sides become greatly diminished by their high grade of civilization, overtaxed brains, and nervous systems. It may also be due to the intermarriage of persons afflicted with transmissible diseases resulting from debauchery.

Another valuable writer on the subject of dental deformities was Dr. Langdon Down, of England, although his theories to-day

have been replaced by better ones. He says in his works that especially the V- and saddle-shaped arches are more frequently found with the idiotic than in people in a sane condition. Talbot and others, within the past few years, have, in regard to these conditions, made personal observations of hundreds of idiots and feeble-minded subjects throughout this country, but found that such conditions do not *per se* indicate idiocy, and that among them only fifty per cent. could be classed as having contracted dental arches, while fully fifty per cent. displayed large and well-formed jaws. Talbot found a greater percentage of V-shaped arches among the deaf, dumb, and blind than among the idiotic.

An old theory is that of Dr. Ballard, one which is constantly receiving attention even in these days. He holds the belief that the V-shaped arch is due to thumb-sucking. He also says it is found mostly in idiots; yes, he even goes so far as to say that children, sucking their thumbs, show therein a predisposition to idiocy. It is well known that a child, if it suck its thumbs, will not hold it directly in the centre of the mouth, and will therefore not produce the V-shaped type of irregularity, but generally holds the left thumb somewhat to that side, and the right to its corresponding side. Thus, if thumb-sucking would produce any deformity, it would not push out the central incisors, and surely not towards a cutting edge, as they are usually found in V-shaped arches, and somewhat twisted. Further, if this theory of Dr. Ballard be correct, why does thumb-sucking not affect the temporary teeth? Those teeth come during the period of thumb-sucking, and children generally stop this habit before they reach the age of eight or ten years. The fact is that the temporary teeth are hardly ever found irregular, and I have never heard of a V-shaped arch in a child's mouth.

Another able writer is Dr. Coles, but his theories are also old, and have been discussed so often that a constant rediscussing is a waste of valuable time in dental meetings for those who read and keep up their studies. Dr. Coles thinks that high arches are mostly found in small-skulled idiots,—that is, in creatures whose skulls are ossified in a very early period of life, due to an inflammation and hypertrophied condition of the brain membrane *in utero* or soon after birth. This is confined mostly to the bones forming the base of the skull, and more particularly to the sphenoid bone. Dr. Coles says that the early ossification and contraction of the bones tend also to draw in the maxillary bones and their alveolar border. If we now examine a skull, we will find that the floor of the nares

is on a level with the condyles of the occipital bone, but the roof of the nasal cavity is on a level with the sphenoid. The palate, then, is entirely out of the range of the sphenoid. Now, if this bone (sphenoid) does not contract, it may cause some contraction of the nose, but not of its floor or the roof of the mouth. I cannot see how a contraction of the upper part of the nares could possibly cause an anterior protrusion of the superior maxillary alveolus. But I can very well understand that a long superior alveolar border produces at the same time a high vault, and the latter is Dr. Talbot's explanation of a high palate.

Dr. Tomes says, in his work on oral surgery, that irregularity, especially the saddle-shaped arch, is due to tonsillitis or some other throat-trouble, causing the child to breathe through the open mouth. His explanation of the results is as follows: By opening the mouth the buccinator muscles are drawn tense, thus pressing on the developing teeth. Now, the buccinator muscle lies in the cheek, and presses uniformly on the whole posterior part of the alveolar border of both upper and lower jaws. How, then, can it, when drawn tightly on the whole line of teeth (both jaws), cause a dropping in of three or four, or sometimes a single upper tooth, and at times even on one side of the jaw only. This theory is old, very old, and has been discussed and thoroughly defeated time and time again, and still it has adherents, and is brought up again and again. Only yesterday I read in the *INTERNATIONAL DENTAL JOURNAL* a paper on adenoid hypertrophy, an essay read and discussed before such an able body of men as the New York Odontological Society. The effects of adenoid growths, the theory advanced both in the paper and in the discussion, is nothing more nor less than the theory of Dr. Tomes,—mouth-breathing. How such a body of men could take all those evolutions for granted, discuss and fully believe in the plausibility of that theory at this date, is more than I can understand. How many persons suffering from V-shaped arches have adenoid growths? How do the believers in the mouth-breathing theory account for arches that are V-shaped on one side only? Have any of them ever seen a single jaw developed symmetrically alike on both sides? How is it, then, that they can still believe in such theories?

Another theory of dental irregularity is that of Dr. Kingsley, who ascribes irregularities to hereditary diathesis. If that were true, the child would have exactly the same irregular development as its parents. In practice, though, that is not often found to be the case.

When I hear of such old theories still discussed, still believed in, it appears to me as if a great many professional brethren do not read new works. I think that this is especially true of the young men in the profession. Dental meetings are always short, and time is too valuable to be spent for the benefit of the lazy and thoughtless class of men. Of all the subjects most neglected by that class in their readings and study, dental etiology seems to be the one. It is true, it requires a little more careful thought and more work to keep abreast with the time. A little reading and thinking will do a great deal in this line, especially to render discussions more fluent and more valuable, and it is about time that such old and far-fetched theories as some of those spoken of should be dropped, and the newer, simpler, and more reasonable ones carried out more fully.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular meeting Tuesday evening, January 20, 1891, at the Academy of Medicine, No. 17 West Forty-third Street.

The President, Dr. William H. Dwinelle, in the chair.

INCIDENTS OF OFFICE PRACTICE AND CASUAL COMMUNICATIONS.

Dr. S. G. Perry.—Mr. President, I do not want to take up the time of the essayist of the evening by a consideration of trifling things, but as the sum total of our knowledge is made up of trifling things, perhaps I may be allowed a minute or two to bring to your notice some instruments I have recently had made.

At a recent meeting of this Society I showed some root-canal reamers that I ventured to call "safety" reamers.

Their safety consisted in having their cutting-flanges very shallow, so that they would not bite nor wedge, and their handles very small, so that even in careless hands but little purchase could be had on them.

They were made of forty-two-gauge wire, in lengths of from half an inch to four inches and a half, and the short ones were to be used in the back-action hand-piece, or to be rotated between the thumb and finger.

The longer ones had handles only half an inch long, and were intended to be rotated between the thumb and finger, or in the engine hand-piece.

Constant use of these reamers has so impressed me with their value that I have gone a step farther and had some of them made with long handles, to be used in the hand in the ordinary way or to be used in the engine if desired.

These instruments are seven inches long and the handles four and a half inches. The shafts are very flexible, and they can be easily rotated while bent at right angles.

The ends of the handles are smooth, so as to rotate easily in the palm of the hand, and that part of the handle grasped by the thumb

and finger is slightly milled, so as to give a little more control of the instrument.

The cutting-points are long and have a very gradual taper, which adds to their safety, as they cannot cut a great deal in one place. They do not cut rapidly, which is another element of safety.

Some of the points are extremely small, and for opening the end of a root, in order to tap an abscess, are superior to any instruments I have ever seen.

I have never yet known one of them to break.

In showing these instruments, I do not want to be understood as advocating the reaming of root-canals to any great extent. Many roots are flat, and all are not straight, and generally it is a dangerous practice, particularly when the engine is used; but most canals can be opened a little to advantage, and the gradual taper of these instruments makes them admirably suited for that purpose.

As before stated, the cutting-blades are shallow, and on each instrument there are a relatively large number of them, so that they do not bite too much, or bind so as to endanger the instrument. The blades are cut slightly spiral so that the edge of each presents to the greatest advantage.

They are not intended to be self-cleansing. To make them so would necessitate deeper channels and higher blades, and that would make an instrument that would bite so deeply that in the engine or in a careless hand it might break.

But the instrument can be often removed from its work, when it will free itself and be ready for a new start.

Dr. S. E. Davenport.—About a year ago a lady patient presented herself in great distress of mind, and in need, she claimed, of immediate attention. Upon examination I found that the entire enamel face of the right superior central had split off from the rest of the tooth, the break extending as far as the enamel did, but not quite to the gum,—all the gums having receded somewhat. The canal and pulp-chamber of the tooth had been filled with oxychloride of zinc for several years, and large gold fillings had formed both distal and mesial surfaces of the tooth until the break dislodged them.

The tooth seemed to invite the misfortune, for, besides the weak features already referred to, the cutting-edges of all the incisors were much worn, and the anterior and posterior plates of enamel were therefore separated at the very point where the greatest strength was needed, for the patient was obliged to use the front teeth more or less in masticating, several molars having been lost for probably ten or fifteen years. What was to be done?

The first thought, of course, was a porcelain crown, but, aside from the voiced objections of the patient, there were other reasons why it did not seem best at that time to resort to that method. The teeth being crowded, of a very peculiar color, and singularly constricted at their necks, I doubted my ability to find a suitable porcelain tooth to attach to the root, and it always seems a pity to cut off a natural crown, or the strong parts of one, unless it be really the last resort.

The enamel face had only slight portions of dentine attached to it, and certainly seemed too frail to do much with, but when placed in position, with the exception of the sides from which the gold fillings had fallen at the time of the accident, the tooth certainly looked well enough to encourage me in at least experimenting with the parts remaining.

A narrow band of twenty-two-carat gold was carefully fitted around the neck of the tooth, extending from slightly below the gum to a trifle beyond the point of fracture.

The measurements for this band were taken with the enamel face in position, and, when soldered, I was able, by slightly pinching the band together, to get it past the portion of the crown which was attached to the root, there being so much of this structure wanting where the proximal fillings had been. With sufficient force I adapted the band to its place, its front lower edge then being ready to receive the upper portion of the enamel face.

The dam was then applied to all the front teeth, the remaining portions of the broken crown were slightly grooved, and the enamel face was cemented to its proper place with Smith's adamantine cement, the cement also forming the fillings of the approximal surfaces and running through the groove at the cutting-edge. When this had hardened somewhat, a small hole was drilled through the centre of the enamel face and extended through the tooth to its palatine surface. A rivet of gold and platinum, fitting the drill-hole quite closely, was cemented into this shaft and polished off flush with the enamel on both anterior and posterior surfaces.

A few days since I saw the patient for other operations and could detect no weakness anywhere about this tooth, though the zinc phosphate has worn away slightly at the cutting-edge and may need occasional renewal.

The band which holds the upper edge of the fractured enamel seldom shows, but if the lip is drawn up the band looks, at a distance of three feet, like a marginal filling.

The rivet is seen only if looked for, and the patient is well pleased with the result of the experiment.

Dr. N. W. Kingsley.—I do not suppose, Mr. President, that Dr. Davenport would pretend that that was the first time an operation of that kind had been performed, but only presents it as a successful case of that sort. Not less than fifteen years ago a gentleman who was at that time Secretary of State of the United States came into my hands, having one of his central incisors split off in exactly the same way, and it was treated in the same way that Dr. Davenport describes, with the exception that I did not put a band around the neck of the tooth; but I riveted and cemented it in the same way. It lasted about a year and a half and then split in two; but during that year and a half it was the best thing that could have been done.

Dr. Perry.—I have a lady patient who wears five of those restorations. Three or four have been worn four or five years at least. The pieces were simply dovetailed and cemented on with zinc phosphate in the usual way. Four or five years ago a lady came down from White Plains with the whole outer plate of enamel of a central broken off. She brought the piece in her pocket-book. I dovetailed the piece and set it on with zinc phosphate, and it has not come off yet. I am glad to hear Dr. Davenport report this case, because I believe it is better to save a natural tooth in that way than to attempt too soon to crown it. Crowning can always be done as a last resort.

The President.—I saw in Dr. Perry's office, the other day, a patient for whom he had cemented a piece to a tooth, which, if I mistake not, he had implanted.

Dr. Perry.—Yes, that was an implanted tooth. It was an old tooth, and having been out of the mouth for some time it was dry and full of cracks, and one day the patient came to me in great trepidation with a V-shaped break out of the end of the tooth. It involved the inner and outer plate of enamel, and extended from the cutting-end of the tooth perhaps half-way up to the gum. It gave the mouth a singular appearance, the tooth seeming to be divided into two pyramidal spikes. I very quickly and easily cemented the piece in its place with the oxyphosphate, and it has been on now, I think, a little over a year and has not changed its position at all. Those who have had much experience in implanting teeth must have learned, to their discouragement, that teeth that have been out of the mouth for some time become thoroughly dry and liable to crack, particularly the older teeth. Young teeth

do not seem to crack so readily. I have had such an unfortunate experience in implanting teeth in that way that if I cannot obtain a reasonably perfect tooth I implant a perfect natural root, and put on that root an artificial crown. Not long since I planted a root in a new socket, and while the root was in place filed the end of it and ground and fitted a crown. I then took the root out and attached the crown with a pivot in the usual way, and, setting it back, ligatured it with silk to the tooth adjoining. I told the patient to report in a day or two. She did not come for several days, and I finally sent my secretary to inquire the reason, and she said she had been so comfortable she had not thought it necessary to call.

Dr. William Jarvie.—I have repaired quite a number of broken bicusps in a little different manner from that which has been reported; cases in which the outer, or buccal, cusp has been broken off, the remaining part of the tooth being strong. I have taken either a cuspid-plate tooth or a tooth for rubber, ground grooves in the porcelain, or, where practical, have utilized the pins, and attached this to the portion of the natural crown remaining, with zinc phosphate. I have quite a number of such cases that have been doing service for several years. Two I saw the other day that have been on ten or twelve years, and had not been disturbed at all.

The President.—Gentlemen, I have the pleasure of introducing Dr. George T. Stevens, of this city, who will read a paper entitled "Some Conditions of Mutual Interest to the Dentist and the Oculist."

(For Dr. Stevens's paper, see page 145.)

The President.—Gentlemen, we have listened to a remarkably interesting paper this evening, and one that has very intimate relations to our profession, on reflex action. Attention has been called to this question very frequently of late. We have certainly been highly entertained. The subject is open for discussion.

Dr. Kingsley.—Dr. Stevens queries if I may not have changed my mind during the time that has elapsed since the quotations made from my book were written. I have not changed my mind, and I am half inclined to think I wrote wiser than I knew. But I believed it then, and I believe it still. I have seen nothing in the fifteen years that have elapsed since that passage was written (which was not published in book form until some years after) to change my mind. I infer from the opinions given by the essayist this evening that he adopts and confirms the same doctrine. I

cannot quite see how any one who has made any extended observations of those matters and reflected upon the subject can come to any other conclusion.

There is a subject akin to this, germane to it, which you will permit me to speak upon a few minutes. It has been broadly hinted at by the essayist, and was brought particularly before us at our meeting last December, when we were discussing the subject of the influence of adenoid growths upon the form of the jaw or the palate. I have seen a great deal of malformations of the palate, using the term palate in the broader sense, malformations of the maxillæ on each side of the palate, the *tout-ensemble*; I have been puzzled a great deal to find a reason for it; and in the absence of finding a specific cause I have fallen back upon the general one embodied in the statement which I made so many years ago. But particularly since that paper was read, two months ago, has my attention been called to the subject in the cases of three patients who are in my hands now for treatment; these three cases are similar, and distinctive from any other I may happen to have. All three have protruding upper teeth. The teeth are standing forward, not all of them exactly alike, but in each the teeth protrude so much that it is difficult for the lips to be brought together, and when the mouth is open, as in speaking, the teeth are in full view. One of these patients is the daughter of a distinguished physician in this city. She is now thirteen years of age. She has been under the care of a physician, who removed from her upper pharynx an adenoid growth. It is stated that before that time she always breathed through the mouth, never through the nose. Now she breathes through the nose very well, but there is a deformity of the jaw. I took models of that case. Only the last teeth, the second molar on each side above and below, occluded. The jaws were open in front fully half an inch, and the upper teeth were standing forward. By a cursory examination I got the idea that the lower jaw was at fault, that it was bent down, but on taking models of the case and articulating them, there was as perfectly formed a lower jaw as I ever saw,—symmetrical in proportions and symmetrical in profile. The superior jaw, from the canine region back, dropped, and the dropping of the teeth manifested itself particularly at the locality of the twelve-year-old molar teeth, and that kept the teeth in front from coming together, leaving a space of a half to three-quarters of an inch between them. There is no question about the upper teeth protruding; there was not only a sinking of the upper jaw at the sides, but the front teeth

protruded. The upper molar teeth stood directly over the lower ones and articulated properly with them, so far as the perpendicular line was concerned. The palatal arch was broad, not high, not narrow, but what is called a saddle-shaped arch. Notwithstanding the fact that there had been adenoid growths there, and the fact that the child had been a mouth-breather, it does not seem to me possible that it is other than a mere coincidence, or that this form of jaw is the certain result of those adenoid growths. That jaw was perfectly formed in infancy; the development of the teeth was perfect as to line; it was only when the permanent teeth were erupted that the deformity began to show itself. I cannot see how a growth in the upper pharynx is going to bulge down,—not the palatal bone, but the alveolar process at the side, right under the antrum.

The other two cases came into my hands about the same time. One of them was the daughter of a physician in Cincinnati, a man of education and standing. He brought his daughter to me; he heard through Dr. Lincoln, with whom he had a personal acquaintance, something about this question of adenoid growths, and he took a deep interest in the matter. Here was the projecting jaw of his daughter; the jaw projected a great deal more than the other cases that I have described, and more than any other case that I ever saw. That child is thirteen years of age; there was no adenoid growth, and she had never been a mouth-breather. Her lower jaw was so nearly a copy of the one I first described that I have had the models mixed two or three times, and it was difficult to distinguish them. There is a malformation of the upper jaw, but no adenoid growth.

In the third case there was a projection of the front teeth. There was some evidence to my mind, in my early practice, that this condition was due to thumb-sucking, or to sucking something, but I begin to doubt that somewhat. This third case presented all the evidences of thumb-sucking, but I found on inquiry both from the mother and the boy himself that there had never been any thumb-sucking. I also found there was no adenoid growth. Now, when we come to V-shaped or projecting jaws, I do not think, if I had not already put myself on record in regard to their origin, I would dare to do it now. Why? Because it seems to me that the more I see, the less I know, the more befogged I am, and the less I am able to give any scientific explanation of the real causes that produce these results.

Dr. Perry.—I was extremely interested in this excellent paper,

in which the subject was so clearly and so plainly stated, so free from technical words and yet so full of good sense. There can be no consideration so important to a dentist as the proper care of his eyes. I am certain that the poorest professional work I have ever done was that which was done four or five years ago, before I suspected there was any need for the use of glasses. My attention was called to the matter by a remark made by Dr. Jack, who said he was certain that dentists often suffered from not early being made aware of the need of glasses. I am certain that in my case I do better work now than I did for some time before I put them on. The idea that I did not yet need glasses was confirmed by the oculist to whom I went to have my eyes examined, for he said, "Your eyes are perfect; what did you come to me for?" I repeated the remark that Dr. Jack had made, and the oculist said I might put them on without harm if I wanted to, but he hardly thought I needed them yet. I did put them on, and, although so early, I am satisfied that from that time I have done better work than I was doing, and with less danger of straining the eyes. This last consideration is one of the greatest reasons for using glasses early. Very severe headaches have been very common with me for a great many years. I cannot say whether they were more frequent or more severe before I wore glasses than they have been since, but I am inclined to think, after hearing Dr. Stevens's paper to-night, that perhaps the best solution of the cause of my headaches is very close application to work the day before and late reading at night. I have sometimes thought I could trace a connection between very close application to my work on a dark afternoon and a very severe headache the following morning. The life insurance people have told me that I am in perfect health, and yet for years I have had these dreadful headaches at quite frequent periods, and I have never before been able to assign a cause that now seems so reasonable as that of overstraining the eyes.

Dr. G. W. Weld.—This paper has been very interesting and instructive. In relation to the wearing of glasses, I want to say that two or three years ago a gentleman came to me to have his teeth attended to, and incidentally said he was suffering, or had suffered, with intense headaches; also that he had some trouble with his eyes. I asked why he did not go to some oculist and have his eyes examined. He said his eyes did not trouble him very much, and he had not thought very much about glasses, but he would go. I believe he went to Dr. Agnew, who prescribed certain

glasses, and afterwards told me he had a pronounced case of astigmatism. I have seen the gentleman within a short time, and he informed me that very soon after he had his eyes examined and the glasses adjusted his headaches left him, and he now has no suffering whatever, so far as his head is concerned. It seems to me, as Dr. Perry has just said, that it is better to use glasses a little too early than a little too late.

Now, with reference to the paper and the relations between the eyes and the teeth, it seems to me that the mutual benefit, so to speak, is rather on the side of the dentist, for while the oculist can, by a process of elimination, determine the cause to be reflex disturbances, due to some affected tooth, yet I do not see how the dentist can tell just exactly when that reflex disturbance occurs. When I recommended the gentleman to Dr. Agnew I did it more out of sympathy than knowledge. I did it on general principles. I did not do it because I saw or understood there was a reflex disturbance.

Dr. William F. Holcombe.—I have known Dr. Stevens for many years, and he has a specialty within a specialty. Those anomalies of vision, as they are called,—squint-eye and insufficiencies of action of the eye-muscles,—are not always relieved by glasses. It has been recognized for a great many years that such cases could be benefited for a short time only with glasses; then patients have to change to other glasses, and finally no kind of glasses will suit. In this line of eye-diseases Dr. Stevens excels, and has been in advance of other oculists in relieving the irritation that comes from these defects of muscular action, or want of accommodation of the muscles of the eye. If any gentleman present will try to look like this,—squint,—he will see that it will cause pain in the brain. Suppose that goes on for twenty or thirty years! But there is Ben Butler, who has been doing it all his lifetime; and I have often wondered if he has constant headaches. There are thousands of people who have headaches on account of squint-eyes, but many people squint and have no headaches at all. I have sent many patients to Dr. Stevens that I could not benefit, and I have never known of one whom he has not helped. So I came here to learn; and I want some of these doctors to give some explanation how, by overuse of the eye, a man has the *toothache*, as Dr. Stevens has just stated he had. I want some of these doctors who must know of such *similar cases* to relate them. I have not been able to solve that from anything I have seen or heard, or any cases excepting the one that Dr. Stevens has given us. I understand how headaches

will come from not being able to see correctly, or how they can come from overuse of the eyes; but I cannot quite see sufficient connection between the nervous structure of the eye and the teeth that would account for such pain in teeth. I feel very grateful to Dr. Stevens, and think the American oculists ought to recognize him as being far in advance in his specialty. He read a paper two or three years ago in Washington before the Ophthalmological Congress, and I then believed he was so far ahead of them that they did not appreciate his paper. I do not think they understand the skill and ability which he has succeeded in obtaining from his constant performance of operations upon these very peculiar cases that he has been treating for thirty years. That skill does not come in a moment. It is a very difficult thing to cut an eye just enough and no more. One can cut a squint-eye very easily, but often it is found that the eye turns out just as much as it turned in before the operation, because it has been cut too much. I would rather operate for cataract than for strabismus. I think it one of the most difficult operations to do correctly and exactly, because squint-eyes come very often from the eye not being able to see well. The eye turns because it is not used, and I know of a dozen cases of that kind within thirty-five years, where the squint has only existed because of permanently defective vision.

The first man to cut an eye for squint in this country is living to-day; I think it is Dr. Detmold. It is only a short time that this operation has been performed generally in the profession. It is only recently that we have become at all familiar with these delicate operations for changing and correcting the deficiencies of vision arising from irregular action of the eye. How can we come to a correct conclusion in this matter? One man who consulted me for great pain in his head was the eminent engraver, Edward C. Marshall. He overworked with one eye, as engravers and jewellers do, and the pain in his head was doubtless due to the use of one eye, and the result of the use of one eye upon the brain. Rest alone cured him.

Mr. President, I want to ask this Society about a small matter. During the war I had a pupil who went down to South Carolina, and among the things that he brought home was a set of dental instruments of very antique date; and I would like to know if there is any place where I can deposit them, where they would be of interest to your profession. If there is, I will bring them here. It is a full set of dental instruments, used in ancient times for the extraction of teeth.

Dr. Jarvie.—With reference to the kind offer of Dr. Holcombe, I want to say that this Society has quite a number of interesting specimens of teeth, instruments, and appliances, and we would be very glad to have the instruments the gentleman speaks of. I move you that the instruments be accepted by the Society with thanks to Dr. Holcombe.

The motion was carried.

Dr. Jarvie.—The paper read this evening is a very interesting one, and, as Dr. Perry says, contains very few hard words, and is written in a style that every one can understand. I do not suppose there is a gentleman here who could not relate dozens of cases where reflex action from the teeth to the eyes has taken place, but there has been a disposition to deny that affections of the eye ever cause the teeth to ache. About a year ago a lady was brought to me by a physician; she had a splendid set of teeth, but she was suffering from neuralgia in the right side of the face, and she declared the cause must be the first molar. The bicuspsids and molars, in fact, all of the teeth on that side of the upper jaw, were perfectly free from decay. Her physician had been treating her for neuralgia for some little time. Occasionally the remedies would have some effect, but generally none at all. I thought possibly the pain might be caused by exostosis or pulpitis, or some obscure trouble, but I could not determine what it was. While the lady located the pain in the first molar, there was nothing to indicate to me that that tooth was the cause of the neuralgia more than any other. About two weeks from the time I first saw her she came to me and insisted upon my extracting that tooth. She was almost demented at the time from pain. Her physician also urged that it be done. Against my better judgment I did extract the tooth, hoping that I might find exostosis or pulpitis, but to my disgust I found no exostosis, no pulp-stones, nothing abnormal about the tooth. The lady went away and her condition remained about the same as before. Her physician was not treating her for any trouble of the eye; whether there was any affection of the eye or not I do not know, but the case was very similar to the one Dr. Stevens has described, and I wish I had heard this paper one year ago.

Dr. Davenport.—Mr. President, only a single thought. Our proceedings will be published, of course, as usual, and I think it is hardly just that one statement made by the essayist should be allowed to appear without some reference having been made by a dentist to the changes which have taken place during the last few years in the methods of treating abscessed teeth. Dr. Stevens has

told us how unfortunately he was treated when his dentist decided one of his teeth to be in an abscessed condition; and I think any reader of his paper would gather from it that either it was the essayist's opinion, or the opinion of the gentlemen in the dental profession with whom he had associated, that the usual method of treating abscessed teeth which were giving severe pain was to extract them. I do not intend to refer to other methods of treatment, but I wish simply to have it go on record that the cases where abscessed teeth are extracted by the progressive practitioner of the present day are very rare, and then only as a last resort. It may be that in some special cases, such as the one just related by Dr. Jarvie, extraction seems better than to subject the patient to a long course of treatment, the patient being in an anæmic condition, or in a discouraged nervous state from long suffering; but there is a different course to pursue, as we all know, and it is usually well taken.

Dr. J. Morgan Howe.—I think we are to be congratulated on the knowledge and interest that the essayist has shown regarding dentistry; although he may have wrongly attributed the reckless practice of former years to the present time. The recognition he has shown of the reflex relations that exist between the teeth and the eye, and also the mutual interest between practitioners who have eyes or teeth under their care, I think is especially a matter for congratulation. We have occasionally in our meetings considered reflex irritations, having their origin in teeth, affecting the ear, and Dr. Houghton, Dr. Sexton, and others have written on that subject with much interest. I think we owe many thanks to the essayist of the evening for having given us the results of his experience, and his recognition of certain mutual reflex disturbances which may be manifested in either eyes or teeth. We must acknowledge that we have been altogether remiss in failing to appreciate the fact that neuralgias so frequently have their origin in ocular disturbance, which may affect the teeth in such a way as to cause us to commit an error. I should say from my present standpoint that the dentist was never—begging our esteemed friend Dr. Jarvie's pardon—justified in extracting a valuable tooth, apparently in good condition, unless he could diagnose a cause for such procedure. We do not know what foolish action the distress and pressure of a patient may lead us into, but in the calm way in which I can speak now I say I would not be justified in taking out a tooth unless I knew there was good reason for such action. I especially wish to thank the essayist for opening up the way for us to dismiss such patients in future by sending them to the oculist.

Dr. Jarvie.—I fully agree with Dr. Howe that the case did not justify in cold blood the extraction of the tooth; yet I did it, under the pressure of circumstances existing at that time.

Dr. J. Bond Littig.—It will be remembered that I reported a case last year of a patient who suffered for months from severe neuralgia from some cause seemingly remote. I sent that patient to Dr. Stevens, who told him he would need to have an operation performed on his eyes, but the patient did not like the idea and urged me to destroy the pulp of the tooth, which seemed to be a possible cause. The death of the pulp gave no relief, and not until the operation was finally performed on his eyes, two years later, did relief come. If the patient had taken Dr. Stevens's advice at first, he would have had a living pulp in that tooth to-day.

Dr. Lord.—Mr. President, I move you that we cast a hearty vote of thanks to the essayist of the evening for his very valuable and instructive paper.

Motion carried.

Dr. Groat.—This is a subject that I know very little about, but I have been suffering for three and a half years with neuralgia, and last summer I consulted Dr. Stevens. From the very first operation on the eyes the neuralgic trouble commenced to improve, and I have now very little and only when I use my eyes too much. If I am obliged to operate too long I have pain, but if I am careful of my eyes I have no neuralgia.

Dr. W. H. Atkinson.—I am pleased to be permitted to hear the paper and to go over the ground which a competent person has already traversed so clearly. What I rejoice at most is that there is a growing oneness of feeling among professional healers; they are more fraternal, indicating a stronger desire to learn than to be regarded as learned, as formerly. Specialties are not of long standing; and hardly well enough established to find their basis yet; but by continued iteration of the doctrines which have held sway without adequate study, we are constantly in difficulty as to our ability to come to an understanding of the conditions of the sufferers that come into our hands. In the cases detailed before us to-night it is a matter of astonishment to me how it should have been assumed by any one that they were cases of abscess. As to the case in Dr. Stevens's mouth, I did not hear a single word, beyond the pain suffered, that indicated there was anything like a cold or an acute abscess. The way to discriminate an abscess is to observe where the nutrition in the connective tissue is so sluggish as to set up a retrogressive action in the part, and

induce the pulp either to die or deposit secondary dentine or pulp-stones, or atrophy, and then, if there be a depleted condition of the general system, the mischief might locate itself at the weak point. We want to see that paper published, then study it carefully, and get what we can out of it, so that we may be able to see eye to eye and help each other in our investigations. There seems to be almost always, when pathological subjects are on the *tapis*, a want of knowledge of basal principles. We forget entirely that wherever there is a nutrient activity being carried forward, in healthy or unhealthy conditions, it always is in that portion of the system where the nutrient changes occur, and that they never do occur except in the soft solids; never in the fluids and never pronouncedly in the hard tissues.

There are a great many recollections in my mind, in a somewhat extended experience, of the difficulties of making examinations and arriving at conclusions, and I know a host of cases such as have been detailed to-night where good sound teeth have been removed with a hope of relieving neuralgia, that finally continued until some operation such as exsection of a nerve-trunk was performed. The trouble with the healers has been that they not only did not know how to help people themselves, but did not know who to consult. Now, thank God, we do know who to send to.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,
Editor New York Odontological Society.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE American Academy of Dental Science held its regular monthly meeting in the Boston Medical Library Association rooms, October 8, 1890. President Seabury in the chair.

The paper of the evening was read by Dr. Wm. H. Potter, subject, "Creolin."

(For Dr. Potter's paper, see p. 209.)

Dr. Williams.—I think the paper by Dr. Potter is an excellent one, showing thorough research and giving a full exposition in brief of the qualities of the drug. I had a little experience with creolin a year or so ago, and in my use of it I found that it had antiseptic qualities to a large extent, but the odor is objectionable.

It is called a deodorizer, but I should think that superodorizer would come nearer to the truth. I ceased to use it on account of its strong tarry odor, which is disagreeable to patients, to some more disagreeable than creosote. I had before that used Little's soluble phenyle, a somewhat similar thing, but the sale of this was discontinued on account of its being an infringement. I have also used the "royal disinfectant," which they say at Metcalf's is the same thing as soluble phenyle. It makes a milky solution in water, and has a less tarry odor than creolin. To me creolin is not unpleasant; its odor indicates a positive purifying, corrective quality, which gives the impression that it will do some good, but to the nasal sense of most people it is rather disagreeable. It has one advantage that the essential oils of course have not,—it can be used in aqueous solution, but the essential oils are more durable; the effects last longer and are not so easily dissipated. The coal-tar preparations do not so readily penetrate the tubuli. If we wish to saturate a dead root, for instance, unless we put a little alcohol with them, they will not be well absorbed. I have generally preferred for such use the essential oils, or a slight amount of alcohol sometimes modified with glycerin. There is also a comparatively new preparation which is called liquid cosmoline, which they tell me at Metcalf's corresponds to glycerin,—that is, its relation to the coal element is the same as that of glycerin to animal fat. It is practically liquid vaseline. A little alcohol will thin it to such an extent that it will be absorbed. Of course, as Dr. Potter says, in cases of fistula or abscess something of the nature of creolin or phenyle is often preferable to the essential oils.

Dr. Eames.—I can only add a word in thanks to the author of the paper. There seems to me not much further to be said in regard to this particular agent. My experience, and that of my friends, is that phenyle is now, to quite an extent, used as a substitute for creolin. The use of creolin has, however, been very satisfactory, especially in its kindly action on mucous membranes. I had hoped that some one might bring up pyoktanin, the antiseptic and disinfectant spoken of so highly by medical men.

Dr. Williams.—That reminds me that there is an objection to pyoktanin. Although it has apparently very sound claims as a positive antiseptic, it has one disadvantage for us, which is that it gives a blue color,—produces a blue stain. There is a pyoktanin which gives a yellow color, and which perhaps might not be quite as objectionable, but neither of them could be employed for use in the teeth with any degree of satisfaction.

In my use of creolin, or the phenyle solution, both similar preparations, the creolin being the stronger, I have sometimes found a weak watery solution very useful in saturating a cement which was to be put into a deep cavity where a little softened dentine remained in the bottom covering the pulp. I would treat the cavity first with such strictly antiseptic solutions as I thought the tooth would bear, and then cover its deep parts with Wilson's non-irritant (said to be a magnesium cement) or plaster of Paris wet up with a weak watery solution of creolin or phenyle, these drugs maintaining an antiseptic influence in the cavity. Over this layer an oxyphosphate cement, or whatever is best, may be placed. I prefer something of that softer nature in the very depth of the cavity, as the pulp is less apt to be rebellious, and the filling can be graduated with harder materials as you get farther away from the pulp.

Dr. Andrews.—Speaking of mixing antiseptics with the different powders for the purpose of covering a pulp which was nearly exposed, calls to my mind a paper which was prepared by Dr. Charles Atkinson, of New York, to be read at Berlin. Unfortunately, it was voted there that no paper could be read whose author was absent, so that among other excellent papers it was thrown aside. Dr. Atkinson sent to me, with the paper, some thirty specimens of oxyphosphate fillings, mixed with different antiseptics. They were all in hard cakes, and most of them seemed quite as hard as they usually are when mixed with nothing but the fluid, while the odor of the different antiseptics used was very perceptible. His paper spoke of the importance of using these medicated cements over exposed pulps, and said that a good deal of the antiseptic material can be mixed up with the powder and yet make a good hard filling.

President Seabury.—How are the antiseptics mixed?

Dr. Andrews.—I do not know his method. I suppose the antiseptic, such as oil of cassia, or carbolic acid, is mixed with the powder first.

Dr. Smith.—In a recent issue of the *Boston Medical and Surgical Journal* some writer cautions the medical fraternity against the use of creolin on the ground that it was liable to cause a humor. I presume Dr. Potter may have seen that. It was in the September number, I think, of the *Medical and Surgical Journal*. Speaking of antiseptics as a whole, after reading Dr. Miller's late paper on this subject, one has to come to the conclusion that the supposed new antiseptics are of but little value as antiseptics, and we have to fall back on such agents as carbolic acid and bichloride of mercury. According to his experiments, iodoform, which the medical fra-

ternity have hitherto relied on, amounts to but little as a positive antiseptic. Perhaps when creolin receives his attention it will be classed in the same list.

Dr. Williams.—I think Dr. Miller speaks more particularly of the active agents, which are called germicides or bacteriacides, instead of those that have simply an aseptic influence,—he speaks more of those that will actually kill the bacteria. I think it is now claimed that iodoform is not so active, but very good to keep up the resistance, as in preserving the tissue, or helping it to resist the advance of germ-life.

Dr. Andrews.—Dr. Black, as a result of his experiments, stated, if I remember rightly, that germs not only lived in iodoform, but they increased in it.

Dr. Eames.—There is so much ambiguity concerning the meaning of the words “antiseptic” and “disinfectant” that I would like to know the opinions of the members with regard to it. One authority says that an antiseptic prevents the formation of germs and a disinfectant kills them. Authorities conflict in their definition of these terms. I am led to conclude that both are antizymotics, having the power to arrest fermentative processes. Antiseptics prevent or retard septic decomposition, disinfectants destroy the specific germs of disease, many of which are due to the action of microbes. Therefore many antiseptics are also disinfectants.

Dr. Potter.—The terms disinfectant, antiseptic, and germicide are often used as synonyms. According to Edes's “Therapeutics and Materia Medica,” p. 245, however, the following distinctions should be made: Antiseptics are such substances as prevent putrefaction or septic decomposition, while disinfectants are such substances as render organic matter not only incapable of putrefaction itself, but of becoming the starting-point either of putrefaction or any of the morbid processes dependent on peculiar organized ferments when brought in contact with other organic matter. Germicide is a term which in the present status of the germ-theory is nearly or quite equivalent to disinfectant.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

NEW JERSEY STATE DENTAL SOCIETY.—TWENTIETH ANNUAL SESSION.

(Continued from page 182.)

Thursday, July 17, 1890.—Morning Session.

THE secretary called the roll.

On motion of Dr. Sanger, it was "*Resolved*, That a committee of three be appointed to take into consideration the suggestions made in the paper of Dr. J. A. Osmun, entitled 'From Another Stand-Point.'"

The following resolution was offered and carried :

"*Resolved*, That the State Dental Society of Pennsylvania be invited to meet with this Society in joint session at our next annual meeting in July, 1891."

At the conclusion of the routine business of the morning session the President called on Professor Mayr, the next in the regular order of essayists. The professor stated he had not prepared a written paper, as he preferred to give his views extemporaneously and then answer questions.

ACIDS AND ALKALIES—ACIDITY AND AVIDITY.

BY PROFESSOR CHARLES MAYR, SPRINGFIELD, MASS.

The fact that I am again allowed to address this Society is to me a very great encouragement. It is very easy for almost any one to address a meeting once, but to address the same association a second time is a very difficult and different matter.

I shall strive to do my best to present a subject which in this voluptuous atmosphere will not be too great a strain upon the mental effort to be put forth to understand it, and at the same time shall not be stupid. With this idea in my mind, I shall present to you an old, well-worn subject,—namely, "Acids and Alkalies."

Everybody knows everything about them, so that I have before me the pleasant and agreeable task of presenting to you only the well-known memories of scientific childhood and those things which you have all been familiar with for a long time.

Most of you may reasonably be supposed not to be special chemists, and, as you all know, chemistry, as taught to non-chemists, is very different from what the chemist himself sees and finds.

For instance, I am unable to give you the exact definition of an acid or an alkali, because, while the extremes are well pronounced, there are so many intermediates that the line of demarcation vanishes. The only definition I can give to you sounds ridiculous,—namely, a strong acid is one which is completely neutralized by a strong alkali, and a strong alkali is one which is completely neutralized by a strong acid. Certain superficial methods of recognition do not furnish in reality a good criterion, because they are not good in all cases. Circumstances alter cases so much. That which is an acid under one condition, exhibits characteristics of an alkali under another condition. For instance, there exist compounds of sulphuric acid with acid radicals, in which these acid radicals appear as alkalies, and, while not completely neutralizing the sulphuric acid, they at least diminish its acidity.

Take an alkali like oxide of zinc,—when combined with sulphuric acid to sulphate of zinc, the sulphuric acid is not completely neutralized; the salt reacts acid to litmus. This oxide of zinc combines also with alkalies, and there plays the part of an acid. The alkali is again not neutralized, but its alkalinity is slightly diminished.

There is a group called manganites, in which the peroxide of manganese appears as an acid, while there exist salts in which it appears as an alkali. I do not think the term “acid” is one which is susceptible of exact measurement. The distinction between acids and alkalies is somewhat based on a very uncertain sense,—that of taste. We have not been able to measure taste as we can measure light. Take picric acid, for instance: it has not the least acid, having only a bitter taste, and yet it is a very powerful acid. Among alkalies we have ammonia, which has a very powerful taste, while magnesia has very little such taste; yet the latter is a very much stronger alkali than ammonia; so that our common impressions are liable to lead us into the idea that there is very much greater difference than there is in reality. Our senses were evidently not made to be measuring instruments. Their purposes are those of every-day drudgery, to run the daily course of life.

For the sake of convenience we may group acids into five classes:

1. Very strong acids.
2. Diluted strong acids.
3. Strong organic acids.
4. Weak and doubtful acids.
5. Acids which do not show their acidity by simple tests.

To the first group belongs the well-known trio, sulphuric, hydrochloric, and nitric.

To the next group, phosphoric, the thionic acids, brom-hydric, and iod-hydric acids.

To the group of strong organic acids, oxalic, butyric, citric, picric, tartaric, lactic, and many nitro acids.

To the group of weak acids, carbonic acid, sulphydric acid.

To those which give not sufficiently the acid reaction, boracic acid, silicic acid.

Some acids which seem to be very strong at first investigation, prove very weak chemically. For instance, hydrofluoric acid is only one-fifth as strong as oxalic acid; sulphuric acid only one-half as strong as nitric; acetic acid only one two-hundredth as strong as muriatic, and only twice as strong as carbonic acid.

And just here I will remark that the fact of the existence of very weak acids chemically, while strong to the taste, is a subject which I do not think dentists have sufficiently considered; because the original investigation about them was published in a purely chemical work by Professor Thompson. He has investigated what he calls "avidity." We have all heard of affinities, but avidity is a subject which has not been familiar enough to us, although it is of great importance. Suppose I were to mix some sulphuric and acetic acid together. I put a little alkali in the mixture, not enough to neutralize them both. The question now is in what proportion will that insufficient amount of alkali be seized by the acids present. It will be seized in proportion to their "avidity." So the avidity gives you to a certain extent the measure of the activity of an acid under certain circumstances. This avidity of acids can only be obtained relatively. The acid which has the strongest avidity is muriatic acid, and almost equally as strong is nitric acid. If I mix a pint of muriatic acid and a pint of nitric acid and a quarter of a pint of alkali, the two acids would seize the alkali in equal proportions. But suppose I take sulphuric acid, which is not as avid as muriatic or nitric acid, having only fifty-nine one-hundredths of the avidity of muriatic or nitric acid. If I were to make a mixture of muriatic and sulphuric acid, and put an amount of alkali into it insufficient to neutralize it, two-thirds of this alkali would be seized by the muriatic acid, and only one-third by the sulphuric. So that in this fluid, besides the two acids in excess, there will be twice as much chloride (speaking of equivalents, not by absolute weights) as sulphates. Oxalic acid has two-thirds the avidity of muriatic acid, and on the other hand acetic acid (the acid of vinegar), which is

very biting, indeed, has absolutely no avidity compared with these acids; that is to say, if I were to put one thousand pints of acetic acid with one pint of sulphuric acid, and put in just enough alkali so as not to neutralize both, every atom of sulphuric acid would have to be neutralized before the first atom of acetic acid could be neutralized by the alkali. So, if we were to mix one hundred pints of the strongest citric acid and one pint of muriatic acid with the proper amount of alkali, again, every drop of muriatic acid would have to be saturated by alkali before one drop of the citric acid would be allowed to combine.

This side of acid questions is just beginning to be considered properly, and in dentistry I think it is one of very great importance. Yesterday the question of erosion came up. The acid which causes this erosion (if it is caused by acid), or, I will say, the acid which *might* cause this erosion, certainly acts in proportion to its avidity. That is to say, suppose we have an acetic acid. This is a volatile acid, and is much weaker than a non-volatile acid. So the acetic acid has less avidity than lactic acid. Hence, if there was a mixture of lactic and acetic acid, the lactic acid would seize the lime before the acetic acid would act upon it. If you expose a piece of marble to the action of acetic acid, it will be dissolved in a crumbling manner, while if you expose it to the action of muriatic acid, it will remain smooth on the outside and become quite polished; and if you expose it to the effects of an acid the avidity of which is somewhere between these two, it will also be eaten smoothly. As a rule, in teeth a smooth and not a crumbling erosion is found, so that acetic acid is certainly not one of the acids causing that erosion.

The exact avidity of many organic acids has not been determined, because of the difficulty of separating the products.

This avidity explains also in a very satisfactory manner the reactions.

If we distil salt with sulphuric acid to obtain hydrochloric acid, the process is one of avidity more than affinity.

I do not care to go into the question of avidity any further, because it may not strike you, as dentists, as a matter of interest, although to us chemists it is a matter of very great interest. So much, therefore, for the matter of avidity.

Now we come to another aspect, that of acidity.

Acidity is a matter of our sense of taste, and of nothing else; that is to say, if you put ten thousand drops of water with one drop of sulphuric acid, you will perceive some acidity should you place it upon your tongue, while, if you mix together ten thousand

drops of water and one drop of acetic acid, you cannot taste it at all, although, strange to say, you can smell it a little. If you mix ten thousand drops of water with one drop of oxalic acid, you can just about detect the presence of acid by taste. That is acidity. I do not think we have any other measurement for the acidity of an acid. The *affinity* of an acid (which is a term also frequently used) implies far more force than activity or avidity. By the affinity of an acid we understand its potentiality under given circumstances to combine with other chemicals,—that is to say, the possibility of a substance to combine. When speaking of affinity the circumstances of the experiment are of the greatest interest. To illustrate. Take silicic acid, which is not subject to the test of taste; place some silicic acid with some sulphate of soda in a crucible, heat it and wait until the soda melts, and the sulphuric acid comes off in great quantities, and finally every trace of sulphuric acid will be expelled by the silicic acid. The affinity of the acid has been greatly increased; the avidity, I presume, has also been increased; the acidity has not increased at all. So with boracic acid. I doubt if by its taste it can even be called acid, but if it is melted it is found to have very great avidity and affinity. So it is with a great many other acids; but I will not go into details, as I do not wish to be tiresome.

Now, as to the tests in the mouth for acids. Yesterday litmus paper was suggested, and various methods were spoken of in which to get a good, sensitive litmus paper. Litmus is excellent for most purposes, but it is too easily affected by carbonic acid, which will turn it quite red. It is also affected very much by the vapors of ammonia in the air, which very likely reduce its sensibility. For that reason I consider litmus paper somewhat treacherous in some tests. The best test is an alcoholic solution of carmine, which has to be applied of itself; you cannot make paper of it. Carmine turns yellow with an acid, and a purplish red with an alkali. There is a chemical substance (phenolphthaleine) which is perfectly colorless with an acid, and wine-purplish with an alkali. This can be used on paper. Ammonia affects it but little. There are a large number of similar test-papers which have been made out of aniline dyes, which are very useful. I have made this matter a special subject of investigation, so as to produce a test-paper which dentists can utilize for the various chemicals they use in their laboratories. For instance, a dentist wants to know whether his hydrogen-peroxide is still good or not. The best test is a paper made with a little iodide of potash, a little starch, and bicarbonate of soda, the mixture being

smearred upon ordinary blotting-paper. So long as the hydrogen-peroxide is good it will produce blue spots on that paper, and when it produces only a purplish spot, or no spot at all, it is worthless. That is a simple test, and this paper will keep an indefinite length of time. For the mixture I take five grains of iodide of potash, five grains of starch, and half a pint of water, with a small pinch of bicarbonate of soda, and put the mixture upon any kind of paper that will soak it up, and so long as your hydrogen-peroxide is good it will produce a blue spot upon the paper. I have found this a very valuable test-paper. Then, for the various kinds of acids that you meet, an excellent paper is a decoction of logwood. With most of the chemicals this will turn different colors; with an acid, bright red; with an alkali, purple; ordinarily it is a kind of brownish red, and I consider it very useful, indeed. With a logwood test you can tell ten times stronger acids than with the litmus. A volatile acid on such a paper produces a reddish halo around a bright-red spot. A non-volatile acid produces only the spot with no halo, because no acid vapors spread around it. The test-papers are, I think, very valuable for practical purposes, and you can very easily make them, and with weak and strong acids and alkalies the indications are very good and valuable. Among other substances, aropæoline, for instance, is very useful; with an acid it is yellow, and with an alkali it is red, and the change is very prompt and very striking. You have probably all of you seen the experiment where a man pours water from a pitcher into a tumbler, and the moment the water touches the tumbler it is turned into red wine; then he takes the tumbler and pours the wine back into a pitcher; it is perfectly plain, you can see that it undoubtedly is red wine. But the moment afterwards he pours it out of the pitcher as water again. This is done by the use of penolphthaleine, which is perfectly colorless and as clear as water; but when mixed with alkali it becomes a fine purplish-red. So when you spread it upon paper in the presence of an alkali it will show bright-purple spots. On these papers you can also test chemicals that belong to the organic alkaloid group,—namely, morphia and such chemicals.

As a rule, I do not prepare a long paper, because it is impossible for me to ascertain beforehand what will meet with the popular demand, and I should be apt to bore the Society with general technicalities and complicated technical matters, because of not knowing exactly what you would like to have me tell you. I prefer to have the gentlemen present ask me any amount of questions, for that will probably bring out much better just what you would like

to have me tell you, and will be of far more benefit than an hour's talk upon general matters. I should, therefore, like to be asked some questions.

Dr. G. E. Adams.—In what proportion would you mix the iodide of potassium and the starch?

Professor Mayr.—About three grains of iodide of potash, three grains of starch, and about one ounce of water. That will give a very fluid combination, and when spread on some kind of reception paper will make a first-rate test. Whenever you get a violet spot, the peroxide is of questionable value, and when blue it is very good.

Dr. G. E. Adams.—Must this paper be fresh every time it is used?

Professor Mayr.—No; you can keep that paper for a long time. It will turn slightly purplish, but not enough to interfere with the reaction. If that purplish tint should be objectionable, you would only have to add a little bicarbonate of soda. In certain atmospheres the paper will take a bluish tint; for instance, near the ocean, the ozone and the peroxide of hydrogen, which are found in the air, turn the paper blue, and after a while it will become quite a dark blue; still you have no difficulty to distinguish the result when making the test, as very much stronger spots are produced than the general darkness of the paper.

Now, in regard to alkalies. Perhaps that is a slight hobby of mine. I did not dare present it under its heading; but if the gentlemen are not too tired, I would like to speak of it here.

We have the organic alkalies, the so-called ptomaines, about which I once read a paper in Boston, and I was very sorry to see that because I gave it under its true title it was not properly appreciated. These organic alkalies are of much greater importance to us than lime, ammonia, and all those common alkalies. I had occasion, about five years ago, to translate the work of a German chemist, Dr. Brieger, on this very subject. He had succeeded in isolating the poison which is found in hydrophobia. The poison which causes the symptoms of hydrophobia is an alkali, and that alkali is manufactured by the microbe which produces the hydrophobia. I have since made a number of experiments, also to see if I could not get some of these alkaloids. I have succeeded in producing a few of them described by Dr. Brieger, but the work is extremely complicated and very difficult. As a rule, in order to make these experiments, a part of the body has to be exposed to the action of the microbes from a pure culture.

For instance, you may take the liver, the heart, etc.; these organs must be exposed to the culture of the microbes for from six to eight weeks, and gentlemen with lively imaginations can readily understand that this kind of work is one that should be conducted with open windows. These poisons, when produced, are most remarkable. The following have been well isolated: That of typhoid fever; that which produces in summer very frequent and very disagreeable complaints after eating ice-cream, stale milk, and stale cheese, etc.; that of poisonous mussels. As I have said, the poison of hydrophobia has been isolated. I recently had the pleasure of reading a very interesting paper by a physician who furnishes proof that life can be killed only by life. Take, for instance, the disease of diphtheria; this has been treated very many times by various applications, but the remedy for this disease seems to be erysipelas; the microbe of erysipelas, in a number of well-observed cases, entirely destroyed the microbe of diphtheria. In the experience of this physician, he found that by the application of this remedy he produced erysipelas to a slight extent, but it stopped developing all at once, and in a few days the patient under treatment rose quite well and quite rid of diphtheria and erysipelas. The two microbes had killed each other; he persisted in his theory and inoculated a number of persons suffering from diphtheria with the microbe of erysipelas. The affection apparently started and then disappeared, while the diphtheria also declined, and he has lost but one single patient out of a large number of cases treated in this way. This is a solution which I have always dreamed of in the field of microbic investigation. Life can only be killed by life; I don't think we can kill life by the application of inanimate drugs. My belief and my line of philosophical search certainly would not lead me in that direction.

As was suggested, in order to reduce decay we should kill the microbe of lactic acid which produces the decay; the portion of the tooth which has been destroyed during the process of its activity cannot be recuperated. I do not think we have even the slightest hint which will suggest to us any way in which lost tissues can be recuperated. The man who can tell us how decayed matter can be restored has found the fluid of eternal youth, the elixir of life; for the same principle which will recuperate teeth tissues will rejuvenate the whole person from head to toe. The secret, therefore, of recovering lost tissue is, in my opinion, not yet accessible. I even doubt if we are in a position to investigate that subject, and we should therefore direct our attention to a much

easier problem of how to ward off an injury. There seems to be a well-settled principle that there are two contending forces everywhere in life, the one attacking from within and the other from without; but this subject is not, it seems to me, sufficiently realized. If we could appreciate this properly, we could more readily understand the fact that by this simple combination ninety-nine one-hundredths of all the cases in regard to the decay of teeth, etc., could be explained, each one individually. I do not think we will progress at all by debating in general about "activity of tissues;" "her health declined," etc. Beyond the principle of the survival of the fittest, I do not think there are any generalizations on that subject.

The experiments that have been begun in the line of organic alkalies are, in my opinion, investigations which lead up a little to that thing which humanity is striving after,—the elixir of life. Many of these organic alkalies are deadly and destructive. Take, for instance, the poison produced by hydrophobia,—one-twentieth of a grain produced the disease in a rabbit, and one-sixth of a grain of the poison taken from the brain killed a rabbit. If we can find such an active agent in the line of destruction, it is reasonable to suppose we can find just as active a power in the line of building up. We have only just begun our discoveries in the line of destruction. The investigation of this subject in the line of building up our bodies is not yet begun; the microbes of building up have not yet been investigated, but only those of destruction. Our whole bodies are essentially a collection of microbes. Every part seems to have a different set, and I believe that we shall yet find means and ways of cultivating the different microbes. It is within the line of possibilities that presently the cultivation of the microbes of the different organs will be a recognized industry, and by proper inoculation we shall be able to secure those for new kidneys, new brains, or anything of the kind. This is not a matter which has been created within the brain of the speaker by the extreme heat, for just as there are microbes of destruction, why should there not be those of construction?

Dr. Charles A. Meeker.—I would like to ask a very simple question, and sometimes it is the simple matters from which dentists derive a great deal of information.

Oftentimes our patients call upon us and say that their physicians have given them a preparation of iron,—an acid preparation, you might say; and we all know that in time this has a very disastrous effect upon the teeth. What preparation would you give

to counteract the effect of that acid—what alkali? Would a solution of bicarbonate of soda be a good preparation to use in that case?

Professor Mayr.—That is certainly a very good one.

Dr. Meeker.—Do you know of a better one?

Professor Mayr.—In my opinion a physician has no right to so prescribe.

Dr. Meeker.—But sometimes they do.

Professor Mayr.—I would blame the physician then. There exist hundreds of preparations of iron which are alkaline, and in my opinion a physician exposes himself severely who prescribes an acid solution of iron. When there is two or three per cent. of muriatic acid in the stomach there is no need of an acid solution of iron. I think a physician ought to be given the thorough benefit of every possible blame for such a course. There are cases where pills made by Bland have been administered as a tonic. They consist of green vitriol, slacked lime, and a little bicarbonate of soda. They are entirely tasteless, and are easily dissolved in the stomach. It is a very effective preparation of iron, and I have used it in my own practice. In one case I gave a servant girl these pills; I made them large, thinking a servant girl would not appreciate anything which was very small. I put a little sugar in the mixture, and it looked real nice, and I told her to take three pills a day, and she took three pills three times a day without material injury. The iron is dissolved in the easiest manner, and I never saw a better preparation than that. I would certainly severely blame a physician who would prescribe an acid preparation of iron. That might have been done in the olden times, when they didn't know of any better means to be used against chlorosis than to dissolve iron nails in vinegar and drink it, but now we have such a number of alkaline preparations that I think those of an acid character have no place.

Dr. Meeker.—What was the iron given for?

Professor Mayr.—To color the blood and prevent chlorosis. As a fact, however, the blood in people suffering from chlorosis contains just as much iron as the blood in people having the dark-red fluid. The iron is there, but for some reason or other their red corpuscle factory, or spleen, makes only colorless blood-corpuscles, and it seems necessary to throw upon the organs that produce such corpuscles an extra amount of work, and then they make the red blood-corpuscles. The iron passes off; the amount absorbed is ridiculously out of proportion to the amount given, but while it

passes through the system it is absorbed, has to be worked up, and that party of microbes whose business it is to make the red blood-corpuscles get all at once smothered with iron, and work to get rid of it, and thus get their activities aroused and finally get up to working-pitch. That is the office of the iron,—it merely arouses the red blood-corpuscles, producing activity, which an easy, normal course of life would not do. So also with morphia. If a person takes a quarter of a grain, it is absorbed in the system, and yet it can be recovered almost entirely in the urine. That shows what an amount of work may be done on a set of cells by the mere passage through them of a certain chemical. The mere passage of the morphia through certain cells in the brain produces a terrible amount of activity, although the morphia passes off. So it is with quinine. Ninety per cent. of it passes off without being damaged, and might be used over again; at the same time it has done its business.

Dr. Peirce.—It has been a whip?

Professor Mayr.—Yes, precisely.

Dr. Meeker.—Will the professor be kind enough to give us the prescription for that pill?

Professor Mayr.—I would use a drachm of sulphate of iron,—ordinary green sulphate of iron,—and one drachm each of carbonate of potash and starch, to be made into pills about, perhaps, one-sixth to one-quarter of an inch in diameter; the dose to be about three pills a day. That is entirely an alkaline preparation. The pills are spongy; they are not very solid.

Dr. Meeker.—How many pills would that make?

Professor Mayr.—Well, perhaps not a very great number,—just about enough for one case,—perhaps twenty or twenty-four pills. I generally use about that quantity. I use the metric system myself, and have to give it to you approximately in drachms. The preparation is very soluble, and has not the disagreeable effects on the intestines that follows the use of many fluid iron preparations. I have never known it to cause diarrhœa or anything of that kind.

Professor Peirce.—I have been very much interested in Professor Mayr's remarks. In the early part of his address he stated that there were certain acids which produced what we call erosion, some which left the surface rough and others which left it smooth. Where these acids leave the surface smooth, does the acid act also on the organic tissues as well as on the inorganic, and is that the reason the surface is left smooth?

Professor Mayr.—Certainly not. I think in that case a far more complex question than the mere action of acid arises. The question of polishing is a very important one. I do not think that acetic acid or lactic acid have a very powerful dissolving action on organic matters. Besides, the tendency of the tissue is to alkalinity and not to acidity. Yesterday I heard a statement made here that the natural condition of the tissues is that of acidity, but I myself should consider it one of alkalinity.

Dr. Meeker.—What acid affects most rapidly the oxyphosphate fillings in the mouth?

Professor Mayr.—They are most usually affected by the crystalline acids; lactic acid affects them very powerfully, acetic acid not so powerfully. By changes of modes of living the different effects are shown. I had such a filling for fifteen years which kept perfectly well; it was on an open, exposed surface; it has never needed renewing. I had oxyphosphates in the front teeth that had to be renewed once every year. I think that these oxyphosphates suffered from something which has been mentioned during this meeting,—I mean abrasion. It came in contact with some gland which secretes either lactic acid or another crystalline acid, and dissolves rapidly. But the filling, which has kept perfectly well, also came in contact with a great deal of acetic acid in sour food, but did not dissolve.

Dr. Meeker.—We find the disintegration of the oxyphosphate in certain cases where it is in contact with the margin of the gum or quite near it?

Professor Mayr.—There the action would probably be that of lactic acid, because the lactic acid is found to be the acid in decay, and I presume that the lactic acid is frequently the acid which is at work in causing erosion and caries.

Dr. Meeker.—And the condition of the system would have some effect, inasmuch as it would produce more lactic acid in one than in another.

Professor Mayr.—I am very greatly in the dark there; I have found that it depends a good deal upon the surroundings. Not long ago I had to make a large amount of butyric acid, which is made by taking milk and chalk and yeast. They ferment together for about one year, and a very odorous fermentation is the result. During that time I noticed that all my gums became sore, my teeth were tender, and the membranes swelled up, presenting a somewhat scrofulous appearance. After I was through with the experiments these symptoms disappeared. I repeated the ex-

periments and found I had only to go into that room where I made butyric acid to be infected with the germ. The germ of butyric acid seems to be the same as that of lactic acid, only another stage, and I think that the spores thrown out implanted themselves to an undue extent in my mouth, and my gums became sore. I found out in other ways that I had been actively infested by the germ of the acid. The air about me became strongly odorous; I presented the odor of old socks all the time. I could not be blamed for it; it was in my opinion a pronounced infection of lactic acid. There was a boy who worked in my office, and I had him in that room, and I said one day, "What is the matter with you? don't turn your mouth this way;" and he said "I cannot help it; I think I make the same odor that is in that pot." So he insensibly admitted to me that he was also infected with it. I think in many cases there may be infection with the germ of the lactic acid. After I stopped the experiment the whole train of symptoms totally disappeared, so much so that the doctor who had charge of my teeth noticed it. I think that very frequently such outside matters are the cause in those cases.

Dr. Meeker.—With the knowledge that the chemists have of the secretions of the oral cavity, can they improve on the oxyphosphate as a filling?

Professor Mayr.—The oxyphosphate is a filling that for practical purposes is very fine; but chemists who have time and leisure, and means and wits and brains and inventive skill, have been working for a long while on the idea of a filling that would resemble the teeth more closely and be stronger and harder than the oxyphosphate and not so easily affected as it is. But at the present time I think that the oxychloride is sometimes better than oxyphosphate. I have tried both and prefer the oxychloride. But you cannot give a general rule; in some mouths one would stand better than the other.

Dr. R. McLean Sanger.—Pardon me for digressing a little from what the professor has been saying; but last year, from the reading of his able paper the impression went forth that he would not recommend the application of the remedies of hypophosphite for the building up of the tissue, which is perfectly correct; but it is well established in medicine that many remedies, like iron, quinine, and mercury, are eliminated, or forced out of the system, just exactly as they went in. And so the thought came to me, in connection with his talk of last year, that possibly the benefits of the hypophosphite were not as tissue-builders, but as the "whip"

which he has already spoken of, to make the lower tissue-builders do their work. I speak of this to-day because for a year it has been bothering me, and perhaps some others of us labored under the same delusion,—that Professor Mayr meant to discourage the use of the chemical properties of hypophosphite as remedies; so I would like to ask him to-day to correct to the meeting, as he has to me already personally, that impression.

Professor Mayr.—In regard to this hypophosphite, I will say that I read the report of my address, and noticed also that it did give somewhat the impression that I did not consider them of value. I do consider them of great value as a stimulant, as a tonic; but of no value whatever as tissue-builders. That is to say, the atom of hypophosphites introduced into the system, four hours afterwards will be found as such in the urine; but while it has gone through the body it has done a vast amount of stimulating and arousing; it has whipped somebody—it did some business. I noticed that a theory was propounded that the hypophosphites had changed to phosphates. To a chemist that is a most untenable theory. The body itself is not only a very poor oxydizer, but it is ever a powerful reducer. I should rather expect indeed to see the reverse effect; as a rule there will be no oxydization to speak of, and hypophosphites do not oxydize so very easily.

Dr. Meeker.—Does this apply to Horsford's preparations?

Professor Mayr.—The Horsford preparations I do not consider very good, for the reason that they are but little stimulant to the body and are certainly not assimilated. I have made experiments and found that every grain of acid phosphate taken into the system is thrown out with very great rapidity. It is not needed in the system. So these acid phosphates may be a palatable drink, just like a great many other things that we take, but I do not think they are, as a rule, of the least value as a tonic or otherwise; quite to the contrary, they demoralize. The stomach does not want too much mineral acid food. If you want to get a good acidity of the stomach, put bicarbonate of soda in it, and it will pour forth volumes of hydrochloric acid, while, on the other hand, if you put a mineral acid into the stomach, it diminishes its acid-producing qualities; this is simply on the principle of general natural obstinacy. It don't want to do the thing which you think natural for it to do; but try to make it go the other way, and it will do just that very thing.

Dr. Sanger.—What preparation would you suggest as a good one where hypophosphates are deemed to be necessary?

Professor Mayr.—The phosphates that are needed in the system can only be taken in their natural combination with albumen, as in grain food. I do not think we have any preparation of a phosphate that is assimilated, excepting that phosphate which is combined with albumen in grain and meat. The gristle in pigs' feet, for instance, contains a great deal of very assimilative phosphates; they are ready to be assimilated, they have not become bone yet. I do not think we have any chemical preparation whatever that is as assimilative in the line of phosphates.

Dr. Meeker.—I should like to ask the professor about something which has always been curious to me, and that is, what acid there is in asparagus and what effect it has on the system as it goes through the kidneys?

Professor Mayr.—Well, there is a compound in asparagus called asparagine—asparaginic acid and asparagine; the peculiar change it undergoes is as unknown as that of turpentine when inhaled. You can in the laboratory change the odor of turpentine into an oil having an odor somewhat of violets, but it is very uncertain whether anything like it is going on in the kidneys.

Dr. Meeker.—Do you know whether it has any effect upon the blood? People seem to think it has.

Professor Mayr.—Yes, they have an idea that the odor which follows its use was somewhere hidden up in the system, and for that purpose in France a great remedy for all kinds of diseases is a kind of black radish which they cultivate there to a very great extent, and which creates a somewhat pungent odor, and they think that when the smell comes off with the eructations it is taken somewhere out of the system. I think when the smell comes off the odorous matter is in the asparagus or the radish, and that by meeting with some other chemical in its passage through the system the peculiar odorous matter is somehow or other made out of the asparagine.

Dr. J. A. Osmun.—I would like to ask you, as you were speaking of acetic acid being an active principle of decomposition, and also as producing caries, whether it is possible to produce a mouth-wash which will kill the microbes or retard the action of caries?

Professor Mayr.—I think that there you will meet with the same perversity of nature that you have in the stomach, and the more alkali you put on the glands the more they will pour out; by the principle of natural perversity you will find that no success will be reached, for by trying to neutralize it by an alkali you will find they will all be the more active and work the harder. I think

that a good preparation is something containing a little salicylic acid. Most of you have heard of the very disagreeable odor arising from sweaty feet. In that case there is an excess of butyric acid; that is what causes the odor. Soda won't help it very much, but very mild sulphuric acid is a very good remedy indeed. An alkali does not remove it at all. The other day a gentleman brought me a little box of a French preparation for which he paid five dollars. I examined it, expecting to find some powerful chemicals in it. It was powdered alum, worth two cents a pound; and it worked excellently. It is an acid preparation. In that case an acid preparation prevented those glands from giving acid secretion. I should infer that salicylic acid, if properly used, would be a good remedy. That is not an acid really; it has no solvent powers whatever.

Dr. Meyer, of Baltimore.—I am only here for pleasure, and not so much to take part in this meeting; but I should like to ask the professor to say something about cocaine and its action upon the nerves.

Professor Mayr.—In that case I have to confess my ignorance. Of course we all know the outward effects, but the details are entirely unknown in regard to cocaine. We all know its superficial anæsthetizing effects, but it is entirely unknown by what process or for what reason the effects are produced.

Dr. Newton.—The professor says that the carmine test is very successful; I would like to know how to use it.

Professor Mayr.—I take the cochineal bugs and grind them up in a mortar, with a little alcohol and water, and the solution thus produced keeps perfectly well. Put a little fresh on neutral paper and use it immediately. Litmus paper is affected by carbonic acid, but carmine is not. If I have a solution of bicarbonate of soda and I put a few drops of acid in that, your litmus paper will show apparent acidity; it is no longer reliable; but, supposing I use carmine, it will remain blue until the last drop of bicarbonate of soda has been neutralized. I have made probably five thousand tests, and I find that the reaction of the urine is no value whatever. Within two hours the acidity will be changed to alkalinity, and, by the presence of a little sugar, to that of acidity. I find a great many physicians put stress on the reaction of urine, but it is not of any value at all in my opinion.

THE JAMES TRUMAN DENTAL SOCIETY OF THE UNIVERSITY OF PENNSYLVANIA.

THE regular meeting of this society was held in the Library Building, Wednesday evening, January 21, 1891.

President J. A. McKee, Jr., in the chair.

Mr. Sydney F. Jacobi read a paper on

PYORRHOEA ALVEOLARIS.

He maintained that the exciting cause of this disease, in at least ninety per cent. of cases, was due to a "deposit of serumic tartar" on the cervix and root of the tooth, this deposit being an abnormal exudation from the mucous glands in the free portion of the gum, which hugs the cervical portion of the tooth, and may be induced by any irritation of the tissues at this point.

Other causes he thought to be from mechanical or chemical irritation, such as irritation from a clamp, a bristle from a tooth-brush getting lodged in the gum, undue pressure of a plate against a tooth, or food allowed to ferment between the teeth, thus generating poisonous ptomaines which gain lodgement at the gingival border. Salivary calculus, he thought, had very little to do with causing the disease.

The treatment recommended was first to remove all deposits or other irritants, using great care not to injure the soft parts. Such tartar as could not be reached with scalers should be touched with acid to soften it and then washed away with a strong jet of water from a syringe.

The medical treatment to be that recommended by Dr. Truman, namely, first make an application of a twenty-five per cent. solution of sulphuric acid, using a thin orange-wood point to carry it up along the root as far as the disease has progressed. Apply to three teeth at a time and allow to remain a few seconds, then follow with bicarbonate of soda to neutralize the acid.

Next, wash out with tepid water, and pack the pockets with sulphate of quinia, which will excite healthy granulation.

He then described a bad case which he had treated successfully by this method, followed by a solution of chlorate of potassium as a mouth-wash after each meal and before retiring.

Tincture of myrrh was used in a weak solution two or three times a day.

Discussion was opened by Mr. Louis Stephan.

It was his opinion that tincture of myrrh should not be used in the treatment as it left a resinous precipitate in the mouth and around the teeth, which would hinder the healing.

Also would recommend the commercial sulphuric acid,—Mr. Jacobi having failed to state what preparation to use,—as the aromatic contained useless and harmful condiments.

He advised, in addition to the treatment prescribed, quinine internally (dose, four to six grains) in cases where a tonic was indicated.

He gave as additional causes which might produce the disease,—insoluble dentifrices, charcoal, tobacco, caustic agents, such as chloride of zinc, etc.

As all inflammatory conditions result in development of micro-organisms, he recommended that the use of clamps should be followed by an antiseptic agent, an excellent one being:

R Hydronaphthol, gr. v;
Alcoholis,
Aquæ dest., āā ʒi. M.

A good mode of treatment recommended by Dr. Harlan, consists in first filling the pockets with eucalyptus and iodoform. Allow this to remain a few days, after which the serumic deposits and all exfoliated bone may be removed, the pockets washed and then injected with hydrogen peroxide, which decomposes the pus and destroys micro-organisms.

After again drying the gums, inject the pockets with

Zinci iodinii, gr. xiv;
Aquæ, ʒi.

For chronic cases the proportion of iodide of zinc should be greater.

Mr. Carpenter.—I would like to ask if Mr. Jacobi or others here had any soreness following the application of the twenty-five-per-cent. solution of sulphuric acid?

Mr. Jacobi.—I think not. In a case I treated, of a gentleman who had cancer, he complained of increase of soreness after the application. As to the use of myrrh, it acted splendidly in my case. I saw the patient a few days ago, and found the gums much improved.

W. H. Haines.—I had a case last summer, for which I used the method described by Mr. Jacobi, and followed by a mouth-wash of tannic acid and listerine. The case improved, but did not get well,

so I used iodine crystals, dissolved in creosote, applied around the teeth. This gave considerable pain, the teeth got loose, and the symptoms worse. I abandoned this and used eucalyptus oil and iodoform, followed by quinine, around the teeth. The case improved, but I had not produced a cure when I left home.

Mr. Jacobi.—Why did you use iodoform and creosote?

Mr. Haines.—It was recommended to me.

The President.—We have Dr. Darby with us; perhaps he will enlighten us.

Dr. Darby.—I was just wondering if those teeth would not have been loose, any way, if the gentleman had not used iodoform and creosote. I hardly think the creosote would cause loosening. In cases where the tissues are much inflamed, sulphuric acid will give severe pain for a time.

Mr. Stephan.—I think it would be a better plan to use the acid before removing the tartar, as the coating of tartar would save the teeth from injury by the acid.

Dr. Darby.—That would be good if the tartar covered the whole root, but it is only in nodules.

Mr. Stephan.—Are there not two kinds of tartar?

Dr. Darby.—The worst cases are where but one or two nodules are on the roots. There are some constitutions in which pyorrhœa is incurable, so you must not expect to cure all cases. If you save fifty per cent. you will be unusually successful. I have never seen a bad case where catarrh was not present.

Adjourned.

O. M. BROWN.

Editorial.

PROFESSIONAL PLAGIARISM.

It is questionable whether the majority of readers of dental literature have any conception of the amount of plagiarism of ideas existing in the profession, and it may be surmised that very little interest has been felt, from the entire absence of any allusion to it.

Dentistry has been an outgrowth of innumerable experiments. The foundation was laid in the mechanism of the past. The workers of metals, from the earliest history of the race, had their share in its formation. The artificers in the precious metals that made Italy famous, that gave birth to a Benvenuto Cellini during the Renaissance, with his wonderful art-productions in gold and silver; the Chinese, with their porcelain, and its rediscovery in Europe by Böttger, in Meissen, Germany, all, and more, had to do with the building of our own profession.

Starting from this, dentistry was laid upon new and untried lines. Experience was added to experience, experiment to experiment, failure to failure, and success to success, until a firm basis was secured. Who can tell to-day who were the originators of these many forms of work? Where are the names recorded that should be known and honored? Who can answer?

For a profession barely one hundred and fifty years old, this neglect is certainly not a creditable showing. The excuse may be given that each member has been too busy making professional history to stop to record it. This is only in part true.

The real cause lies not so much in records as it does in the fact that ideas have been appropriated in part and by wholesale in books, papers read before societies, and in practice, until the question of the origin is lost in dire confusion. The unscrupulous character of this work is apparent to the close observer.

One of the most insidious means of destroying all original reputation is the plan adopted by some writers of books. They will ostentatiously parade names of authors in their preface from whom selections have been made, and then deliberately extract ideas by wholesale and ingeniously weave these in with their own in a way

that defies recognition, thus depriving the originals of all credit. Another class will take a portion of an investigator's work and attach it to personal ideas and send this out as original.

Another individual will scan the various journals for ideas and make note of them. In time he is called upon to prepare a paper for some society, and these are then harmoniously blended by the skilful scribe into an essay to be received with honor by his fellows.

Still another discards all these ingenious modes to make a reputation without the trouble of earning it, and boldly opens the journal or encyclopædia and *copies* such of the productions as may suit, *verbatim et literatim*.

This picture is not overdrawn, nor would it be difficult to illustrate by known cases.

Renewed attention has been called recently to this subject by the fact that original work done by the editor of this journal twenty-six years ago, and subsequently published in several articles, and finally in the "System of Dentistry," had been copied from the latter and republished in a monthly dental journal as an original production. It was then transferred to another publication, and the credit in both instances given to the plagiarist. In this case no attempt was made to change the words or construction. Having copied it literally, it was read before a prominent dental society, and was, it is said, received with favor.

From a perhaps mistaken regard for the youth of the individual, this case is alluded to only in general terms. It is cited here, therefore, not as a personal grievance, but as a professional wrong and typical of that moral obliquity which prevails in regard to such matters, and which is certainly sapping the life of our calling.

The impossibility of having a large number of men brought together for special work without a proportion of dishonest ones among them seems to render it necessary that a place of record should be provided, where new ideas and plans of procedure may be entered. If the American Dental Association would undertake this, and publish the results yearly, it would be invaluable in the present, and settle many disputed questions in the future.

No one who entertains a real interest in the growth of his profession cares for a moment what may become of the few grains of original work he may be able to scatter in his lifetime, but he naturally feels a repugnance to have his neighbor transfer the product to his own garden and call the plant by his own name.

The remarkable success which attended the effort of the young man in the case alluded to, in that it could pass the members of a

society and two astute editors, is a warning that should not go unheeded. It calls for closer reading and the memorizing of original data. This, of course, means a labor which very few will care to undertake, and the difficulty can only be met by the plan proposed,—a place of record.

AMERICAN DENTAL ASSOCIATION.

ATTENTION is called to the notice of the committee on another page. The matter of selection of a place for the meeting of the American Dental Association was left in their hands, and it will be held at Saratoga, New York.

While there can be no fault found with this decision, as the whole question has doubtless been well considered, it will unquestionably be felt by some that a more inland location would have been preferable. The expectation was that the committee would have selected Niagara Falls.

Now that the matter is settled, it is to be hoped that the societies will send full representations. This meeting should result in an effort to effect a change for the better in this organization. The profession needs a representative body.

BIBLIOGRAPHY.

A DICTIONARY OF DENTAL SCIENCE AND SUCH WORDS AND PHRASES OF THE COLLATERAL SCIENCES AS PERTAIN TO THE ART AND PRACTICE OF DENTISTRY. By Chapin A. Harris, M.D., D.D.S. Fifth edition, carefully revised and enlarged by Ferdinand J. S. Gorgas, M.D., D.D.S. P. Blakiston, Son & Co., Philadelphia, 1891.

This dictionary has been so long before the dental profession, having been prepared by the late Professor Harris in 1849, that any extended review seems almost out of place. The changes and additions made in this edition since the last, in 1877, almost give dental readers a new work of reference, and tend "to make it a more purely dental work than ever before." That this has been accom-

plished must be conceded, and an examination shows generally careful revision by one competent to effect the necessary changes. "Many hundred words and definitions" have been added, bringing it up to the present period, with the additions made to the nomenclature of dentistry as well as that of collateral sciences.

It is, therefore, with no spirit of criticism that attention is called to several omissions observed in glancing over the pages.

Under the word *Pyorrhæa* is given *Pyorrhæa Alveolaris*, and reference is made to *Alveolar Pyorrhæa*. On turning to the proper page this latter word is not to be found. Indeed, this pathological condition is not properly defined anywhere, the nearest approach being under *Phagedenic Pericementitis*; but it is not there satisfactorily explained.

The description of *Rubber Dam*, or *Barnum's Coffor Dam*, is full enough; but does not do justice to Dr. Barnum. A dictionary of this kind is in one sense a history of the origin of things, and it will be referred to for information by the future collector of facts, and hence should not only be carefully prepared in its definitions, but should be exact in giving credit to original workers. This Professor Gorgas has failed to do in many instances, notably under *Bleaching Teeth*, where he quotes the entire process of the writer of this without the slightest credit.

The various definitions under *Gold* are exceptionally good.

For the dentist this is unquestionably the best dictionary for reference, and not only the best, but the only one extant where he will find all the technical terms used in his profession.

A COMPEND OF HUMAN ANATOMY. By Samuel V. L. Potter, M.A., M.D., Fifth edition. One hundred and seventeen wood-engravings, numerous tables, and sixteen lithographic plates of the nerves and arteries. P. Blakiston, Son & Co., Philadelphia, 1890.

This book has shown by the numerous editions that it has been greatly appreciated by the class for whom it was originally intended,—viz., medical students preparing for the exercises of the quiz-room or for final examination. It is arranged for its special object with care and excellent judgment.

The present edition has an appendix of forty-three pages, containing a complete set of tables and plates of the arteries, the cranial and spinal nerves and plexuses, and the sympathetic nervous system.

ILLUSTRATED CATALOGUE. The Wilmington Dental Manufacturing Co., Philadelphia, 1890.

This comparatively young and energetic corporation presents to the dental profession this well-prepared catalogue. The preface gives a short history of the rise and progress of this company. It was incorporated in 1882. In the year 1886 a controlling interest was secured in the Welch Dental Company, of Philadelphia, and in 1889 the latter was merged into the Wilmington Dental Manufacturing Company, and in May, 1890, the interests were consolidated with the American Dental Manufacturing Company, of New York. This is certainly a remarkable development in the period named, eight years.

VERHANDLUNGEN DER DEUTSCHEN ODONTOLOGISCHEN GESELLSCHAFT.
Berlin, 1891.

The proceedings of this society, under the leadership of Professor Busch and Professor Warnekros as president and secretary, are published regularly in pamphlet form. The papers show in many respects a more satisfactory statement of facts than is customary on this side of the ocean, and in the preparation of illustrations and exactness in following details there is left nothing to be desired.

Current News.

TRACHEOTOMY SAFE AND QUICK.

H. H. SCHUHMANN, D.D.S.

DR. L. OLIVIERI, of Genoa, Italy, has invented an ingenious and novel instrument for the rapid and safe performance of tracheotomy. The main instrument consists of a sharp hook, grooved on its back to the extreme point and carrying on its rear-end a very small arm or lever, which latter carries a very light delicate windwheel. The instrument is intended to be used as follows: The point (of the sharp hook) is inserted into the trachea just below the cricoid cartilage, and the moment it pierces the trachea the air rushes along the groove and sets in rapid motion the little windwheel, thus informing the operator the instant the instrument reaches the proper place. A deceptive or false incision is thus rendered impossible at a time when the saving of a few minutes or even seconds are of

the highest value in the saving of a human life. The more exhausted the patient, the feebler is the current of expired air, and hence the value of the delicate windwheel in these cases. By introducing a probe-pointed bistoury into the groove on the back of the hook and slipping it down into the wound, using the groove as a director, the opening becomes sufficiently enlarged for the next step in the operation. The hook and knife are now withdrawn, and the other instrument belonging to Dr. Olivieri's set is introduced into its place; it is a combined dilator and conductor, and is used to introduce the canula. This conductor is so constructed that it can be readily passed into a very narrow slit, which it dilates by giving it a half-turn. It places the canula in its proper place and leaves it there. The conductor is so ingeniously built that, in case there should be the slightest delay during this part of the operation, the patient can breathe freely through it until it is extricated and the canula remains in its place. Both conductor and canula are made of three different sizes, suitable to patients of different ages. When we remember that tracheotomy is an operation that has frequently to be performed in great haste to save a patient from imminent death, it will be seen that an instrument that makes it possible to perform it with certainty with three rapid motions is worthy of the attention of all oral surgeons and physicians. It is a difficult matter to explain mechanical appliances without illustrations, but if these lines are not fully understood, Dr. Olivieri will gladly give any information desired, at his office, located at 242 Wabash Avenue, Chicago.

ON the line of the New York and New Haven Railroad, just outside the former city, a huge advertising sign-board reads as follows:

DR. ——— ———
 HAS EXTRACTED OVER 500,000 TEETH,
 ABSOLUTELY WITHOUT PAIN,
 DENTISTRY { in all its } FINE WORK ONLY.
 { branches. }
 57 WEST 42D ST., NEW YORK CITY.
 9 A.M. to 5 P.M.—7 P.M. to 8 P.M.

Over five hundred thousand teeth torn from the jaws of his fellow-beings by one dentist alone! and, in addition to this wholesale extraction of teeth, the industrious and indefatigable doctor attends to "dentistry in all its branches" (presumably *roots* as well), and promises "fine work only" in addition.

Half a million teeth extracted "absolutely without pain" implies that every one of them were removed for patients while under the influence of some anæsthetic agent. Although it seems incredible that a single individual could administer anæsthetics and extract such an immense number of teeth in the practice of a lifetime, yet here we are assured in glaring capitals that "Dr. ———" has already exceeded that number, besides attending to "all branches of dentistry," and doing "fine work only." No wonder that the doctor is obliged to operate by gas-light as well as by daylight. It is a wonder if, under the pressure of these varied and multitudinous duties, the doctor gets time to give even a glance at any of the condemned teeth, in order to ascertain if it be not possible to treat and save them for a long period of usefulness.

But why advertise the number of teeth irretrievably lost? Does it signify a lack of ability to preserve these useful members of the human organism when attacked by caries; or are many of them removed with a view of replacing them with artificial dentures, and so keep active the mechanical branch of "fine work only?" Perhaps the "mighty dollar" is so large as to cloud the vision even if it does not veil the conscience. A half million teeth extracted and anæsthetics administered in each case would, at average charges, yield over half a million dollars. Then the profits from the "fine work" of "all other branches" in the line of dentistry (if also done by wholesale) would naturally be several times greater, making an aggregate perhaps of over two million dollars! What a temptation for a rising young man to become a dentist!

What can be the moral effect on public opinion of such roadside advertisements? The dentist, like the oculist, general surgeon, or family physician, is supposed to be a conservator of the human body; not to dismember it or remove any portion possible to save. If surgery means simply to amputate legs, arms, etc., it is pretty harsh surgery, to say the least; and if dentistry means simply to extract teeth by wholesale, and manufacture artificial substitutes, then its benefits to humanity are likewise very limited. C. E. F.

ILLINOIS STATE DENTAL SOCIETY.—The Twenty-seventh Annual Meeting will be held at Bloomington, beginning Tuesday, May 12, 1891, and continuing four days.

GARRETT NEWKIRK,
Secretary.

CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

NEWARK, N. J., February 21, 1891.

THE following officers and members of the Executive Committee were elected for the ensuing year, February 16, 1891.

President, C. W. F. Holbrook, D.D.S., Newark; Vice-President, H. Iredell, D.D.S., New Brunswick; Secretary, S. S. Hawley, D.D.S., corner of Warren and Thirteenth Streets, Newark; Treasurer, Charles A. Meeker, D.D.S., 29 Fulton Street, Newark.

Executive Committee.—George E. Adams, D.D.S., Chairman, South Orange; W. L. Fish, D.D.S., Newark; R. M. Sanger, D.D.S., East Orange; B. F. Luckey, D.D.S., Paterson; S. C. G. Watkins, D.D.S., Montclair.

S. S. HAWLEY, D.D.S.,
Secretary.

DENTAL SOCIETY OF THE STATE OF NEW YORK.—The next annual meeting of the New York State Dental Society will be held at Albany, N. Y., May 13 and 14, 1891.

This will be the most interesting meeting held in years, as matters of vital importance to the dental profession will be presented. Reserve the above dates and attend. Head-quarters, Delavan House.

W. W. WALKER, *President.*
F. T. VAN WOERT, *Secretary.*

CHICAGO, March 12, 1891.

THE Executive Committee have decided on Saratoga Springs as the next place of meeting of the American Dental Association, commencing first Tuesday in August, 1891.

It is hoped by the committee that each society will send delegates, that we may have a full representation from all parts of the country.

Programme and arrangements to be announced later.

J. N. CROUSE,
Chairman Executive Committee.

AMERICAN MEDICAL ASSOCIATION, SECTION OF ORAL AND DENTAL SURGERY.—The Forty-second Session of the American Medical Association will be held in Washington, D. C., on Tuesday, Wednesday, Thursday, and Friday, May 5, 6, 7, and 8, 1891, commencing on Tuesday, at 11 o'clock A.M.

The following is a list of essayists (with subjects), who have promised to prepare papers for the Section of Oral and Dental Surgery :

- 1.—Address of the Chairman of Section..... Dr. Eugene S. Talbot.
- 2.—Adenoid Growth..... Dr. W. H. Atkinson.
- 3.—Treatment of Fractures of the Maxilla.... Dr. Wm. Carr.
- 4.—Genesis of Contour Fillings. Illustrated... Dr. Geo. S. Allan.
- 5.—The Teeth of Invertebrate Animals..... Dr. A. H. Thompson.
- 6.—A Study in Comparative Dental Anatomy.. Dr. Wm. H. Potter.
- 7.—Rheumatic and Gouty Diathesis as manifested in Diseases of the Peridental Membrane..... Dr. John S. Marshall.
- 8.—Dental Infirmary Patients; the Use and Abuse of Dental Charity..... Dr. Richard Grady.
- 9.—Growth of the Cementum..... Dr. R. R. Andrews.
- 10.—Remarks on Incipient Necrosis and Caries.. Dr. J. Williams.
- 11.—Choice of Therapeutic Filling Materials... Dr. W. A. Alport.
- 12.—..... Dr. J. Taft.
- 13.—Thorough Dentistry *vs.* Partial Dental Surgery..... Dr. J. Y. Crawford.
- 14.—..... Dr. Thos. Fillebrown.

Other members who desire to read papers before this Section, should, as required by the by-laws, forward the paper, or its *title* and *length*, to the Chairman, Dr. Eugene S. Talbot, 125 State Street, Chicago, Ill., one month before the meeting.

HENRY W. MORGAN,
Secretary.

NASHVILLE, February 23, 1891.

THE Second Annual Meeting of the Dental Protective Association of the United States was held at the Grand Pacific Hotel, Chicago, December 16, 1890. The president, Dr. Crouse, called the meeting to order, and spoke as follows:

Our second year closes full of encouragement. Last year at our First Annual Meeting we had represented, by proxy and in person, six hundred and forty-eight members. This our Second Annual Meeting is represented by nearly fifteen hundred members,

showing that the membership has more than doubled during the year.

We have driven the Tooth Crown Company from Milwaukee, where they had commenced suits against five members. Our attorneys entered a motion asking the court to set and limit the time when all the testimony should be presented by the Crown Company. After hearing the arguments of the counsel on both sides, the court limited the time to twenty days, and before it was up the Tooth Crown Company withdrew all the suits at their own cost. A similar move in Baltimore, where six of our members had been sued, and we had taken charge of their suits, caused the Crown Company to withdraw all these suits at their own cost. This demonstrates the correctness of what we have all along claimed,—that the International Tooth Crown Company did not dare to enter into a fair contest as to the validity of their patents.

They have now commenced suits in New York, and answers will be filed in due time. We accept licensees on the same terms as others, and afford them the same protection, with the exception of a few licensees located in a very limited portion of the country.

The Dental Protective Association has been giving absolute protection to the entire dental profession, while, thus far, less than one-tenth of the whole number has joined our Association.

We want every member of the profession to unite with us. Ten dollars is but a trifle for each dentist to pay for the protection and benefits he receives. Think of fifteen thousand dentists in one association! Who can estimate the great good that such an organization can accomplish. Is it a dream? No! I expect to live to see it. It only depends on the amount of exertion the present fifteen hundred members put forth. Let every member during the year get three new members. It will be an easy way to treble our membership, which is the great work of the coming year.

We have saved the dental profession a million of dollars the past year and, better still, saved many of its members the humiliation of signing a license that robs a man of his manhood.

I want a committee appointed from this Association to examine our books and methods of doing the work.

On motion, Drs. Gilmer, Fernandez, and Ames were selected.

The election of a Board of Directors resulted in J. N. Crouse, T. W. Brophy, and E. D. Swain being elected their own successors. After further routine business the meeting adjourned.

J. N. CROUSE, *President.*

E. D. SWAIN, *Secretary.*

REPORT OF THE COMMITTEE ON DENTAL PROTECTIVE ASSOCIATION.

AFTER a careful examination of the management and accounts of the Dental Protective Association of the United States for the year to date, we have come to the conclusion that it is being conducted carefully, economically, and with good judgment.

We know positively that the chairman is giving to this work much thought and time, which is the same as money to him; that during the year he has attended several dental meetings in the interest of the Association; that he has devoted much time and labor to organizing the profession and in attending to its litigation, and that he has done all this entirely at his own expense and without one dollar of cost to the Association.

The entire office expense of the Association for the year amounts to two hundred and forty dollars (\$240.00), and that for clerical help.

The Dental Protective Association is saving hundreds of thousands of dollars annually to the profession, and we believe it to be the duty of every practising dentist to assist its grand work by paying the membership fee and becoming identified with it.

It is certainly unjust that a few should bear the entire expense for the benefit of the whole profession, and it is demoralizing to those who quietly accept the fruit of this injustice.

We would further recommend that, as soon as the management think it advisable, after due notice to the profession, the books be closed, and the protection of the Association be withheld from non-members.

THOS. L. GILMER,	} Committee.
E. M. S. FERNANDEZ,	
W. B. AMES,	

RESOLUTIONS ADOPTED BY THE SAN FRANCISCO
DENTAL ASSOCIATION, OCTOBER, 1890.

WHEREAS, Dr. J. N. Crouse, of Chicago, Ill., the chairman of the Dental Protective Association of the United States, is personally known by the president and other members of the San Francisco

Dental Association to be an honest, earnest, and enthusiastic worker for the good of the profession ; therefore be it

Resolved, That this Association endorse the methods of Dr. Crouse in conducting the Dental Protective Association, and strongly urge every dentist of the Pacific Coast to become a member of said Association ; and be it also

Resolved, That a copy of this resolution, signed by the president and secretary, be forwarded to Dr. Crouse, with permission to insert it in each circular that he sends to this coast.

THOS. N. IGLEHART, *President*.

CHAS. E. POST, D.D.S., *Recording Secretary*.

COLLEGE COMMENCEMENTS.

THE Philadelphia Dental College held its Twenty-eighth Annual Commencement, February 26, 1891, at the Academy of Music, in the City of Philadelphia.

The matriculates numbered 315, and the graduates 146. No absentees.

The address to the graduates was given by Professor J. Foster Flagg, and the valedictory by Charles L. Ziegler, D.D.S.

On the following evening, February 27, the Pennsylvania College of Dental Surgery held its commencement at the same place.

The matriculates numbered 251, with 18 absent ; the graduating class, 94.

Professor C. N. Peirce delivered the valedictory.

The audiences were large on both occasions.

The Association of Faculties requires that absentees during the session shall be marked on the published list with an asterisk (*). The absence of this in the Philadelphia Dental College list indicates either a remarkable attendance on the part of the matriculates or a failure to comply with the rule.

Kansas City Dental College Commencement, March 10, 1891. Graduates, 43 ; matriculates, 107.

Ohio College of Dental Surgery Commencement, March 11, 1891. Graduates, 75 ; matriculates, 210.

Missouri Dental College Commencement, March 12, 1891. Graduates, 28 ; matriculates, 90.

THE Eighth Annual Meeting of the Maryland State Dental Association, just closed at Baltimore, elected the following officers for 1891:

Cyrus M. Gingrick, D.D.S., President; B. Holly Smith, M.D., D.D.S., First Vice-President; Bernard Myer, D.D.S., Second Vice-President; F. F. Drew, D.D.S., Corresponding Secretary; W. W. Dunbracco, D.D.S., Recording Secretary; Thos. H. Davy, D.D.S., Treasurer.

Executive Committee.—C. C. Harris, D.D.S., Jno. C. Uhler, M.D., D.D.S., G. Marshall Smith, D.D.S.

A resolution was adopted to include the name of Horace H. Hayden in the memorial about to be established to the memory of Chapin A. Harris.

W. W. DUNBRACCO,
Secretary.

BALTIMORE, February 12, 1891.

HARVARD ODONTOLOGICAL SOCIETY.

THE Thirteenth Annual Meeting and dinner of the Harvard Odontological Society was held at Young's Hotel, Boston, on Saturday, February 28, twenty-four members in attendance. The meeting was called to order at 5.30 p.m., by the President, Dr. William P. Cooke, of Boston; and after listening to the annual reports and the transaction of regular business, the Society gave its attention to the orator of the evening, Dr. Henry L. Upham, of Boston, who delivered a very interesting and scholarly address upon the subject of "Pleasures and Pains;" upon the conclusion of which the members and invited guests sat down to dinner. Among the guests of the evening were Harved C. Ernst, M.D., of the Harvard Medical School; Drs. Thomas H. Chandler and Charles A. Brackett, of the Dental School; Rev. Albert H Plumb, D.D., of Roxbury, and Rev. George A. Crawford, D.D., of Boston; the latter gentleman having formerly held for nineteen years the position of chaplain in the United States navy, and who took occasion, in the post-prandial exercises, to relate many of his experiences and observations, both on shipboard and in China, in which latter place much of his time and life had been spent.

The Society was fortunate in having among its guests Dr. Ernst,

the distinguished bacteriologist, who has recently returned from Berlin with a supply of lymph for the treatment of tuberculosis. The doctor expressed, with much clearness and force, his opinion as to the present and ultimate effects of the parataloid upon patients at present undergoing treatment in the Massachusetts General Hospital, and urged upon the dental profession, in view of the ease with which a localization of the disease may be effected in the pharynx, upon the tongue, and other portions of the oral cavity, by inoculation through carelessness on the part of the operator with the bacillus of tuberculosis, the importance of the most scrupulous care in the thorough cleansing of all instruments after an operation.

Subsequent to the after-dinner speaking, which at the annual meeting is always replete with wit and wisdom, the members throw aside for the time being all thoughts and cares of a busy every-day practice, and, after the fashion of the numerous societies in the academic department of the University upon the occasion of a dinner at this well-known hostelry, indulge in college songs until the lateness of the hour calls to mind the fact that all good times must have an ending.

Previous to adjournment, the following officers were elected for the ensuing year: President, Jere E. Stanton, M.D., D.M.D., of Boston; Recording Secretary, Waldo E. Boardman, D.M.D., of Boston; Corresponding Secretary, Charles H. Taft, D.M.D., of Cambridge; Treasurer, Dwight M. Clapp, D.M.D., of Boston.

Executive Committee: Waldo E. Boardman, D.M.D., of Boston; Herbert M. Clifford, D.M.D., of Boston; W. E. Page, D.M.D., of Boston.

Editor.—Henry L. Upham, D.M.D., of Boston.

Dr. H. W. Gillett, of Newport, R. I., was chosen to deliver the address at the next annual meeting.

CHARLES H. TAFT,
Corresponding Secretary.

THE International Dental Journal.

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No. 5.

Original Communications.¹

THE FORMATION OF ENAMEL.²

BY R. R. ANDREWS, D.D.S.

MR. PRESIDENT, LADIES, AND GENTLEMEN,—In 1888 I had the honor to read a paper before the Odontological Society of Pennsylvania; my subject was "The Development on the Dentine." In my paper I called special attention to the formation of that peculiar layer which is everywhere found between what was fully calcified dentine and the pulp-tissue from which it is formed. It is found in teeth that have been decalcified by the action of weak acid. This issue, which is hyaline in appearance, was, I stated, formed from minute globular bodies that were seen to be in the odontoblasts; they have the appearance of fat-globules, but they are not fat. They are also seen on the surface of the layer, where, by coalescing or merging into each other, they formed large globular masses, and these globular masses coalescing formed the layer of tissue to which Professor Harting has given the name calcoglobulin. It is by further impregnation of lime to become the fully calcified basis substance.

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read at the Union Meeting, Boston, Mass., October 28 to 31, 1890.

I have so far modified my views since reading this paper as to now believe that the odontoblasts, in forming the matrix of the dentine, are only concerned in giving out minute globular bodies, which form the layer of calcoglobulin, not being themselves any part of the matrix. I still hold that the fibres within the tubes are formed from a separate cell deeper in the pulp-tissue, whose processes pass in through the protoplasmic mass of the odontoblasts, and thence into the dentinal tubules of the formed dentine, or, in other words, that the basis substance is formed by a deposit of minute globular bodies, and not by a direct change of the protoplasm of the cells.

This subject proved so interesting to me that I turned my attention to the investigation of the formation and calcification of enamel. My specimens were freshly prepared to show the tissue as near life as possible. My method is somewhat different from those used heretofore. I take the forming teeth from the jaws at or nearly the time of birth, while the tissue is still warm and moist. They are then placed in a one-half of one-per-cent. solution of chromic acid, and this I changed three times daily for three or four days. The edges of the calcified tissue were then found to be sufficiently softened to make a number of thin sections. I first wash the teeth in distilled water, and then place them in a solution of gum-arabic for several hours. Alcohol is used to take out the water, and they are embedded in a preparation of paraffin and lard, which has been poured into a convenient mould, and they are, when cool, ready for section cutting.

The microtome which I use has this advantage over others: the tissue and knife are both under fluid when the sections are cut, and as they are cut they float off and remain in the fluid until they are taken up for examination. I cut until the tissue which has not been decalcified is reached, and each cutting ruins the edge of my knife; but I have the satisfaction of working as near life as I can with my present knowledge. After cutting, the sections are examined, and those which I think are worth keeping are placed in distilled water for a short time to dissolve out the gum, and then are mounted in glycerin jelly. By this simple method I avoid shrinking or shrivelling the tissues, as tissues are when they are kept a long time in acids, in absolute alcohol, oil of cloves, and other reagents, or by the drying processes that prepare them for the beautiful serial sections that are turned out from many of our laboratories, where the Thoma microtome is used.

I regard the generally accepted theory of the conversion of

the cells of the internal epithelium of the enamel organ, the ameloblasts, into the rods or fibres of the enamel as an erroneous one, from the fact that I have often observed in developing teeth a folding-in upon itself of that tissue which is to become enamel, which is found between the formed dentine and the cells of the internal epithelium of the enamel organ. This folded layer is undoubtedly a band of uncalcified tissue, and seems to be formed in these folds, that it may be taken up by the growth of the dentine germ during its rapid growth.

I have quite a number of specimens showing the folding-in of this tissue, mostly from pigs' embryos at birth, and this appearance is so marked that it is impossible for me to give any other interpretation.

This peculiar layer has received attention from most of the investigators. Professor Huxley has stated that it is possible to raise a continual sheet of tissue or membrane from the surface of developing enamel. He concludes that this is the original *membrana præformativa* of the older writers, and that this eventually becomes Nasmyth's membrane. He believes that the enamel was developed without any direct action of the enamel organ, because a membrane separated the two. Tomes believes that this sheet or membrane is produced solely by the destructive action of reagents. Markson believed that it was nothing more than the part of the papilla first calcified.

Dr. Lionel Beale denied the existence of any membrane between the enamel and the enamel-cells. Robin and Magitot offer an explanation of the appearance of such a membrane by stating that the formative pulp is rich in a clear substance of gelatinous consistence; that it is dense towards the surface, where it forms a matrix for the ameloblasts and projects beyond them, so as to look in sections like a sort of varnish, between the enamel and the cells. Being dense near the surface, it may become corrugated and look like a folded or torn membrane.

Frey states that as the calcification of dentine is commencing, the surface of the latter is covered with already hardened, but still short, prisms. Not seldom we encounter appearances as if over these prisms there was superimposed a special cuticle, the so-called *membrana præformativa*. Such a membrane does not in reality exist, however, and the whole is only a deceptive appearance produced by the youngest layer of enamel which is undergoing development, after the decalcification of the whole from the fully-formed tissue beneath.

Klein says that the distal extremity of the enamel-cells, that is, the one next the dentine, elongates, and this elongation he calls an increment, and tells us that this is directly converted into enamel. He states that the increment of the enamel-cells and the conversion into enamel probably occur successively, and this he thinks to be the cause of the striations across the enamel-rods. He states that the enamel-cells, like all epithelial cells, are separated from one another by a homogeneous interstitial substance, and as he finds this substance between newly-formed enamel-rods, he claims that it is by conversion that one is formed from the other. He says that in the enamel of a developing tooth that interstitial substance is always found to be larger in amount than in the fully-formed organ, and this appearance I have repeatedly noticed myself.

Dr. Sudduth, in his article on amelification, in the *American System of Dentistry*, gives very little if any attention to the existence of this layer found between the calcified and the organic tissue. He speaks of the substance found between the rods of young enamel as a basis substance composed of calcoglobulin; he calls attention to important facts which I, myself, have noticed, and that is, wherever enamel is forming the stellate reticulum has disappeared, and the stratum intermedium seems directly in contact with the capillaries of the connective tissue without. It seems essential that capillary vessels should thus be in indirect contact with enamel-cells before the processes of calcification can be commenced. Dr. Sudduth gives not a little space in his chapter on amelification to prove that the enamel, which he rightly calls a coat of mail, and shell, are analogous structures.

There has very recently fallen into my hands, translated by a friend, an article by Dr. Graf Spee, from the *Biologisches Centralblatt*, "On the First Processes of the Deposition of the Enamel." In it he calls the minute spherical bodies, which I call calcospherites, "enamel drops." I will quote a part of his most interesting paper:

"A coarsely granular appearance of the enamel-forming cell has been often observed. Annel rightly claims to have seen highly-refractive granules in the body of the cells, and, according to my experience, these granules are regularly to be found in enamel-forming cells. The abundant appearances of the granules at the time of the formation of the enamel and their entire absence at earlier stages, is an indication that the granules are an enamel substance. I call them enamel drops. Following up their future confirms their appearance. I saw the enamel drops appear only in the half of the enamel-cells which is turned towards the pulp, and

within this half at first in the end which rests on the dentine; afterwards farther up in the cell, but not quite up to the region of its nucleus. Many of them were so small as to be scarcely measurable. They are almost always spherical.

"Great numbers of them are collected at the periphery, and appear here either to be completely arranged or to fuse together. At any rate, one soon finds that on the dentine or on the already formed enamel layer there are no longer isolated or enamel drops, but a more homogeneous mass. The lower part of the cell contains the larger enamel drops, which merge without sharp boundaries into the substance of the enamel-fibres. This then appears as a part of the enamel-cell in which the originally isolated enamel drops have run together into a continuous mass. The growth of the enamel-rod, once begun, appears to take place by the addition of new enamel drops.

"The product of the enamel-cells first to be found is, therefore, not the chemically definite enamel, but an organic precursor of it, which is, perhaps, horn-like, since even the enamel cap which is not yet impregnated with salts, has a horny appearance. When there is a formation of earthy deposits under the influence of cells, the process is of such a nature that at first an organic production is formed, which in turn has the power of easily forming in soluble compounds with organic salts, and thus become hardened."

This "horn-like" substance which Dr. Graf Spee found, was, I believe, the changed tissue calcoglobulin to which I have already alluded.

It may not be uninteresting at this point to quote from Quain's *Anatomy*, vol. ii. p. 71, a few words about other tissues formed from globules. In speaking of the formation of elastic fibres, the writer says, "These, as shown by Ranvier, first appear in the form of granules or globules, which subsequently become fused together, end to end, and are not at any time connected with cells. In elastic cartilage the granules or globules make their appearance, it is true, in the immediate neighborhood of the cartilage-cells, but although this renders it probable that the deposition of the globules is influenced by the cells, it does not prove that they are formed by a direct conversion of the cell protoplasm. Indeed, the subsequent extension of these fibres into those parts of the matrix which were previously clear of them, and in which no such direct conversion of cell protoplasm seems possible, it is a strong argument in favor of the deposition hypothesis. The view which supposes that a direct conversion of the protoplasm of the connective-tissue cells takes

place into fibres both white and elastic has of late years been widely adopted, but it seems to rest less upon observation than upon a desire to interpret the facts in accordance with the conceptions of Beale and M. Schultze, according to which every part of an organized body consists either of protoplasm (formative matter) or of material which has been protoplasm (formed material), and the idea of a deposition or change occurring outside the cells in the intercellular substance is excluded. But it is not difficult to show that a formation of fibres may occur in soft substances in the animal organism independently of the direct agency of cells, although the material for such formation may be furnished by cells. Thus, in those calenterate animals in which a low form of connective tissue first makes its appearance, this is distinguished by a total absence of cellular elements, the ground substance being first developed, and the fibres being formed in it. Again, the fibres of the shell membrane of the bird's egg are certainly not formed by the direct conversion of the protoplasm of the cells, although it is probably in matter secreted by those cells, and through their agency, that the deposit occurs in a fibrous form.

To the dental histologist, enamel is, perhaps, the most difficult subject he is called upon to investigate. While there are many who have shown us the coarser morphology of the enamel organ, there are very few who have had anything to say about the finer processes in the deposition of the enamel. Perhaps on account of the difficulties met with, the subject has received insufficient investigation. The ordinary methods of the laboratories do not give us good results with this tissue. It comes to us so shrunk as to be of little use to satisfactorily demonstrate what the minute bodies, miscalled granules, within the substance of the enamel-cells really are. The shrinking of the cells is caused by the reagents which have been used in their preparation. (See Fig. 2.)

The so-called calcareous granules are minute calcospherites,—they are most spherical. The *nucleus* of the enamel-cell is not always to be found farthest from the calcifying tissue, as authorities inform us. I have sections showing it midway between the two ends of the cell, some being near the layer next the forming enamel, surrounded by very many minute glistening bodies. Between the cell and the calcified material is found the layer of calcoglobulin. (See Fig 2.) It is of the utmost significance to us, because within its substance the first formation of the rods of the enamel takes place. Huxley was right in crediting it with the importance he gave it, but wrong in calling it a membrane.

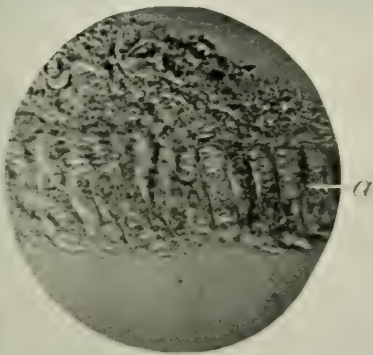


Fig. 1

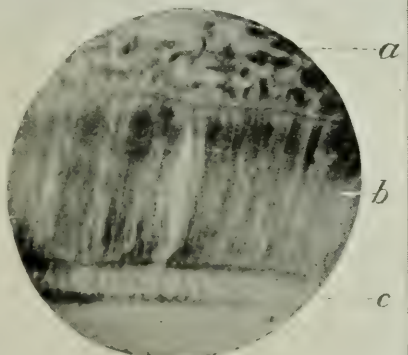


Fig. 2



Fig. 3

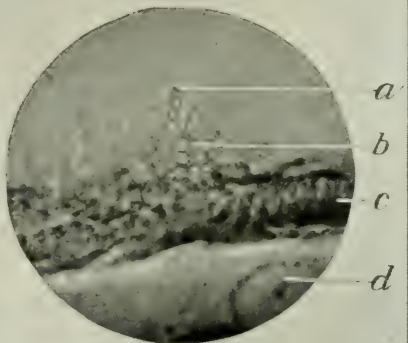


Fig. 4



Fig. 5

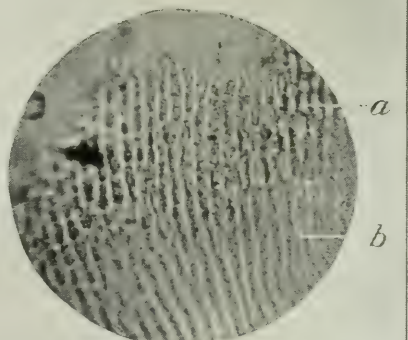


Fig. 6

DESCRIPTION OF PLATE.

- Fig. 1. Unshrunk Enamel Cells. (Calf at birth.) *a*, Young cells containing minute globules.
 Fig. 2. Shrunk Enamel Cells. (Human.) *a*, Stratum intermedium; *b*, enamel cells; *c*, the layer between the enamel cells and the dentine,—the calco-globulin layer, miscalled the membrana performativa by the older writers.
 Fig. 3. *a*, Globules found everywhere over the surface where enamel is forming. (Calf at birth.)
 Fig. 4. Developing Enamel Rods. *a*, Enamel cell containing small globules; *b*, larger globules below the cells forming a rod; *c*, young enamel layer; *d*, dentine. (Calf at birth.)
 Fig. 5. *a*, Globules forming rods; *b*, young enamel. (Calf at birth.)
 Fig. 6. *a*, Globules forming rods; *b*, young enamel. It shows how new rods are added, forming between the others. (Calf at birth.)
 Objective used, 1-12 apochromatic immersion (Zeiss).



It is a tissue formed by the globular contents of the enamel-cells, with a portion of the cell protoplasm, a cement substance. In it the globules are arranged in columns and become the rods. (See Fig. 4.) This is the point I would emphasize, showing, as I believe it does, the methods of nature in forming rods, independent of the cells themselves. By a further process, these globules or masses become calcified, and a part of the already calcified rods. (See Figs. 5 and 6.) I have studied this layer from several hundred sections, in studying the formation of dentine as well as of the enamel.

In the dentine we have a formative pulp, full of nerve-bundles, fibres, and capillaries, and, as a consequence, its calcification gives us a matrix full of organic tissue. In the enamel organ there is an almost entire absence of vessels. Its calcification gives us a matrix almost without organic tissue. Enamel in this early age presents the best possible condition to note the presence of a reticulum of living matter if any were present; but with the best objectives at my command, and with all the care that I could give to the subject, I have failed to find the appearance of anything of the kind.

In tearing off portions of the layer with needles, I have found the uncovered calcified matrix to have everywhere over its surface myriads of globular forms (see Fig. 3) resting in a semifluid, the so-called protoplasmic substance. The cells of the internal epithelium of the enamel organ at the time when calcification is commencing are, if they have been carefully prepared as I have already said, found to be full of these minute globules which I believe to be calcospherites. (See Fig. 1.) These are given out from the cell into the layer continually, forming, by coalescing, larger globules or masses which will become the rods, and are surrounded by this protoplasmic substance which is to be the cement substance between the rods; the cells of the stratum intermedium above are seen to be in direct contact with the embryonic connective tissue, the stellate reticulum having disappeared from that part.

My sections having been made extremely thin, were not stained, and the photographs may not show with all the clearness I could wish, but I believe they will give an outline, at least, of what I have referred to. Some of the sections illustrate my point so clearly as to be almost diagrammatic (see Fig. 4); other sections will show that the protoplasmic substance in which the globules or masses are to be seen is forming the cement substance between the young rods. (See Figs. 5 and 6.) Tissues showing these various transitions are mostly from the teeth of calves at birth, some from human embryos, fifth month, and others from pigs at birth. In

making sections of tissue which is only partially decalcified, I have been able to obtain some pictures of young enamel almost as we see it in ground sections. In the rods of these sections it is possible to mark out the outlines of the globules, or masses, from which I believe they are formed. (See Fig. 6.)

These globules themselves, before complete decalcification has taken place, consist of that substance which Professor Harting has called calcoglobulin. I do not think that the substance between the rods is to be considered this tissue, although Professor Sudduth, of Minneapolis, in his article on amelification, gives it this name, which should be applied only to the tissues which are formed from the globules. It may be of interest in connection with this subject to repeat here a very brief description of the experiments of Professor Harting and Mr. Rainie on the action of certain lime salts on albumen. These investigators claim that the experiments give us an explanation of the methods of the calcifying processes of the osseous tissues.

Mr. Rainie found that if carbonate of lime be slowly added to a thick solution of albumen, the resultant salt is in the form of globules laminated in structure like tiny onions; the globules in contact become agglomerated into a certain laminated mass, appearing as if the laminae in immediate opposition were blended with one another. The globular masses, at one time of mulberry-like form, lose the individuality of their constituent smaller globules, and become smoothed down into a single mass. Mr. Rainie suggests, as an explanation of the laminated structure, that the smaller masses have accumulated into concentric layers which have subsequently coalesced, and in the substitution of the globular for the crystalline form in the salt of lime when in contact with albumen he claims to find a satisfactory explanation of the development of bone, teeth, and shells.

Professor Harting has shown that the albumen left behind, after the treatment of these globules with acid, is no longer ordinary albumen. It is profoundly modified, and has become exceedingly resistant to the action of acids, resembling chitine, the substance of which the hard skins of insects consist, rather than any other body. The small and onion-shaped globular bodies he has named calcospherites, and the layer caused by the coalescing of these, calcoglobulin, as it appears that the lime is held in some sort of chemical combination; for the last traces of lime are retained very obstinately when calcoglobulin is submitted to the action of acids in the same manner as does that layer which is found everywhere

on the border-land of calcification between the carefully calcified and the formative tissues.

I would add, then, in conclusion, that I believe,—

First. That the cells of the internal epithelium of the enamel organ, the ameloblasts, contain in the part nearest the calcifying tissue large numbers of minute glistening bodies, which have been misnamed granules, but which are really calcospherites. (Fig. 1.)

Second. That these minute globules are given out from the enamel-cell into a protoplasmic substance which is on the surface of the first formed layer of dentine, or, if enamel is already formed, on the formed enamel; that here they coalesce and form larger globules or irregular-shaped masses. (Figs. 4 and 5.)

Third. That in this condition they form a layer of calcoglobulin. The globules or masses are arranged in columns, independent of the enamel cell. (Fig. 4.)

Fourth. That this layer is really that which the older writers called the *membrana præformativa*.

Fifth. That the forming rods in this layer calcify and become part of those already calcified, the so-called protoplasmic substance surrounding them becoming the cement substance, as before stated. (Fig. 6.)

[The paper was illustrated by thirty-three photo-micrographs of sections of growing enamel.]

PLASTIC MATERIALS IN THE PREPARATORY TREATMENT OF TEETH.¹

BY JACOB L. WILLIAMS, M.D.

IN the whole scope of the practice of oristry perhaps there is no subject that more constantly presents itself than the need of avoidance of pain, together with the preservation of vitality in the organs to which the larger part of our attention is given.

Preparatory treatment of living teeth, of which only I shall speak, may be advisable in two classes of cases,—one where the pulp is endangered but not exposed, for the purpose of pulp protection, by arrest of caries and favoring deposit of secondary dentine; and in another class, where the dentine is too sensitive

¹ Read before the American Academy of Dental Science, Boston, January 7, 1891.

to permit without discomfort the proper preparation of cavities for permanent filling.

I will briefly mention how I first came to devise a plan for the treatment of the former class of cases, and which resulted in an adaptation for the treatment of the second class.

About the year 1850, and during my early practice with Dr. Keep, many useful teeth that were too frail to bear hard metallic fillings, instead of being doomed to extraction, were filled in various extemporized ways, to render them comfortable while they might last.

A material called Hill's stopping, coming forward about that time, was somewhat used, but, being a mixture of sulphate of lime with gutta-percha, it would become rough or fuzzy in the mouth; also being patented was considered an obstacle to its free use. So oxide of tin with a little fine spar was mixed with gutta-percha, which made quite a solid and comparatively durable stopping. But it had a serious objection in that it became discolored and often discolored the tooth substance.

Thinking over the matter frequently, it occurred to me one day that oxide of zinc might be free from these objections, and on trial I found it to be the fact.¹

As it was common then to take pride in exclusive knowledge, I kept the secret to myself for some time, only loaning it to two students, one of whom gave it the name of "dentrone." They derived some income by making and selling it to Codman & Shurtleff, who found a ready sale for it. When those students came to have no further occasion for that resource, I told the before-named firm of its composition, and they then began to make it for themselves. And being then freely spoken of, knowledge of the composition gradually became more general, and other dealers made it.

To resume. While using the tin combination I noticed, on removing the old stoppings for renewal, that the dentine had become *hardened* as well as discolored, and pulps that were before almost exposed were found protected by a firm covering of secondary dentine; and the thought came to me, Why could not a plan of treatment be adopted for the purpose of favoring this corrective and conservative action?

I reasoned that the morbid conditions in the cavity must first be corrected, and then held in suppression to allow nature to carry

¹ I cannot find any evidence that this combination had ever been made before.

out her protective efforts. Those morbid elements seemed to be fermentive and acid action. We knew nothing of microbes then, and what was the acid I knew not, but Dr. Miller has since informed us that it is mainly lactic.

To correct the fermentative process I saturated the cavity, after slight excavations, with a solution of chloride calcis, and to neutralize directly the acid. I used simple aqua calcis, each of which produced the desired effect.

But then the point was, how to place and hold the mischievous agents in subjection without irritating or destroying the subjacent vital tissues on which depended the renewed protection.

To accomplish this there then seemed to be nothing better at hand than creosote; but that used pure would be too caustic, so I diluted it *largely*, and saturated the cavity with the weak solution, and sealed it up; but how? I reasoned that the interior of a tooth, even in health, being softer and more elastic than other parts of it, something of a similar lack of density, as well as non-conductivity, should occupy the depth of the cavity.

Even the gutta-percha stopping would be too solid for some cases; and for them I mixed beeswax with it for the deeper layer, covering it with the firmer material. I also found that a bedding of oxide of zinc or of sulphate of lime mixed with the mild antiseptic answered the purpose admirably.

These corrective applications were repeated at intervals varying with the apparent needs of the cases.¹

I made a brief mention of this plan in the *American Journal of Dental Science* in 1858.

In the course of time other antiseptics have been added to our armamentarium, giving greater variety of facilities in this line.

The principle of this plan of treatment that I have described is to destroy the morbid agents in the cavity, and keep it aseptic without destroying the living tissues, or so irritating them as to endanger destructive inflammation. And during all the years of practice on this principle, patiently followed, I have found its results successful, even beyond my early expectation. It sometimes seems to require almost an unreasonable amount of patience, but we must learn to wait on nature, or she will not help us.

In regard to corrective applications, how often are caustics or irritants used, perhaps with the idea that the strength of the cor-

¹ This new plan of treatment of course met with many amusing attempts at criticism.

rective will insure the duration of its effect, without considering that it may, as it often does, destroy the desired vital protective action!

And in relation to the relative density of interior dentine to the rest of the tooth, how often do we find an endangered pulp struggling in its minute pulsations against an unyielding phosphate stopping that lies almost or quite in contact with it!

And still further, how often have we seen a hard filling of malleted gold or of amalgam, in a deep cavity, supposed to be safe, but by its relentless presence provoking rebellious inflammation and death of the pulp!

In following up the treatment for endangered pulps, it was readily observed that the marginal dentine also was obtunded, and often only by the presence of the plastic stopping, though the calcic saturation seemed to be a positive aid.

And this manner of obtunding extremely sensitive dentine in preparation for permanent filling I cannot but think preferable to the way of merely putting the fibrils to sleep, from which to wake and find themselves imposed upon by a rigid and temperature-conducting foreign substance, provoking them to neuralgic protests.

WORK.¹

BY PROFESSOR J. S. WIGHT, M.D.

WHEN one of your members requested me to say something to the Odontological Society, I came to the conclusion, after considerable thought, that there was one thing with which we were all familiar,—I mean *work*. On this subject we can all meet with a common purpose; about it we can talk with a common interest; from its consideration we can reap a common advantage.

Of all work under the sun, there is none so noble and just as the work that we do for others. A lazy man will sometimes work for himself; he is like a man in the swim, as they say, he swims or drowns; or he works lest he perish. He is like the beggar who importuned the comedian for alms; and when the alms were not given, and he remarked that we must all live, the comedian told him that there was not the least necessity for it in the world. But a truly noble man will work for others, for he knows that he not

¹ Read before the Odontological Society of New York, February 17, 1891.

only helps others, but in this way he truly helps himself. Do you know that I was asking myself what kind of head-work is the best? And then I thought, that is best which most clearly and logically leads to the betterment of those around us. It does not consist in doing this thing or that thing, merely, but in doing the thing in such a way as to make it the most just for others. That work is best which is built upon what is just and right; from no other source can good head-work come, even in extracting teeth, or in sawing off bones. You may make your work ever so beautiful, but, if it is not just, if it is not right, it is not good. You say, the hand-work has been forgotten! No, I have not forgotten it; nor have I forgotten what a wonderful thing the hand is: how it labors for bread, for adornment, for science, for art, for fame; how it feeds the hungry; how it writes the story of our deeds, good and evil; how it executes the law; how it preaches the gospel and cures the sick; how it preserves teeth; how it works in every field of human endeavor under the sun, in all time and in all places. Neither do I forget how our art has been named after the hand, and that we are called surgeons, and that you are a part of surgery; and then I remember that neither you nor I have a handicraft,—we belong to a profession. Bear with me a little while, and I will tell you a few things that you ought to know, and which will draw the line between a handicraft and a profession.

Do you suppose that you work for yourselves? Does anybody suppose that you do? Does anybody believe that you alone of men are independent of others? Truly, as we labor at all, we labor for others. I cure their bones,—broken, to be sure; you cure their teeth in their autumnal decay, or give them new ones when the old are lost. Do you do it for yourselves? Whatever you do, you do it for another. You say, we do it for a price. Ah, then it is the pay you work for! We belong to a liberal profession. And I, once for all, dignify you with the title of special surgeons,—a part of our liberal profession. How do you like this designation? Do you like to be ranked among that ill-used race of men, among whom the liberality of Heaven brings the rewards of unselfish deeds down to the laps of thankful men? Now, in the name of that liberality which puts a crown upon the head of altruism, which is the patent of noble work, and which springs from the human heart, I plead with you, as I would with all men who labor,—I say it over and over again,—I plead with you to put your work first, to put it above all other things in this world. Put the best thought in it you can, for I can see no other way in which you can

educate the hand to perform its highest duty than by making it ever and always responsive to execute those motions which arise from the best appointed and best cultivated head. The hand should be the facile instrument, quickly, precisely, and pleasantly, to execute and put into shape the ideas of a worker who places his work first. In the revelations of each new day, let the thought that we are doing our best be our inspiration. As I plead for the nobility of work, and as I magnify your profession and mine, I seem to hear some one say "*Tell us about the fee.*" Yes, I will tell you the laborer is worthy of his hire. How unjust it would be to deprive him of it, even though he till the fruitful soil, or sail the restless sea, or grind the nourishing corn, or bind the broken bone, or extract the painful tooth, or do whatever else is needful doing under the sun! But once more I tell you, and to you and all of us it may ever be told, that no man can make his hand-work of that high order which meets the approval of head and heart of the just and the true who first seeks his fee. His heart is in his fee, and his work is outside of his heart, and how could he put the best blood of his heart in his work? How could he put the best thought of his brain in his work, when he is seeking his fee? The best that we can do, the best work that any man can do, is wrought by the hand that is animated by a clear and liberal head, and that can rest with honor upon its owner's breast.

On a cold day in December I went to see a poor woman dying of cancer (I often stand with horror and amazement in the presence of this dread disease), my fee for which came down from heaven with the falling snow. I could not look upon that scene forever, so I started for home, facing the bitter wind and wishing that something could curtain the picture I had left. That something came soon enough, for I got into a horse-car, and in a little time there came in a weary laborer, with scant clothing which was patched and soiled, and in his eyes could be seen a misery and a hopelessness that seemed to be almost eternal and without remedy. He removed the tattered mittens from his horny hands, worn and roughened with work, and then I asked myself, "Does the man work for his fee first or last?" I noticed that the fingers of his left hand were for the most part gone,—worked off, perhaps, by machinery, or falling timbers, or stones. Often have I preserved such a hand for the laboring man, often without money and without price; and often I may do it again. As the conductor took the fare,—the road-fee,—a thought came into my mind,—“Why should not the road-company furnish passes to such men, who have but one hand,

and who can therefore do only one-half hand-work, who work to support their wives and children?" Ah! no passes for such men as these, who do the dirty work, whose hands are rough, hard, and earnest,—these are the hands that built the road for others to ride on. I see the little books in the hands of honorable gentlemen who live without work, and who have contrived by some cunning of their own to make the rough hand-workers build roads for them to ride upon. Such men make others who have only one hand dig, drudge, and toil, in order that they may live by an inane kind of head-work. Then I put a fare into the hand of the humane conductor, who was also a hand-worker, and bade him give it to the one-handed workman, with the injunction not to tell him who did it. Now, let me say to you, that the kind of work that laboring-man does is without fee; it is real work; it is work built on everlasting law; it is built on principles as old, as eternal as the order of the universe.

Did it ever occur to you that if people did not get sick nor injured, they would not need doctors? And if teeth did not decay nor ache, they would not need dentists? I have sometimes thought, and particularly when I have had difficult cases, that if I had made, by evolution or in any other way, the individuals of our race, I would have so arranged the matter as to render them incapable of being sick, or so that no accident could harm them. But then there would be no broken bones for us to mend; nor would there be any filling or extracting of teeth; none of this great and fine work that you and the rest of us do. Then what would become of the money that is transformed into fees? Then what would become of you and me? Why, our bones would always be sound and whole. Our teeth would ever take the place of mill-stones and grind our wheat for us, and so prolong our lives. But do you not think that we could do some other hand-work quite as well as the one kind that we now do? For one moment think of the prospect of having all this skill engaged in the field of productive labor: I mean the skill that you and I possess. In a few years, how it would enrich the world, by leaving in the general aggregate all that is now abstracted, and then adding as much more to it. But you and I will have to keep on earning our fee, only we must see to it that our work is done for the sake of the work, and not for the fee.

You and I go down to the shore and save men, women, and children, for the sake of the fee; and for the same thing we take perishing mortality from the smoke, the flames, and the fire. It is

an heroic, a noble, and a manly work, worthy of praise, worthy of imitation, worthy of remembrance. Yet, think of it! we live and get our living because others suffer pain; because they make mistakes; because of their errors; because of their follies and crimes; because of the calamities of the miserable; because of the misfortunes of the innocent and the unhappy. Think of all the human suffering that is summed up in these few words! Remember that our fee is for the attempt to relieve as much of this as we can. It is almost always an attempt that may or may not succeed. How little there is inside the boundary-line that limits our work,—they only know who do their head-work justly, rightly, wisely. All beyond this line is uncertain or impossible. Once I heard a good man say, “My work, when justly, rightly, and wisely done, doing all that I can do, and leaving undone all that I cannot do, is so pleasant that I would be glad to do it all, both night and day, in storm and in fair weather, if I could have food and raiment and shelter given me by some unseen hand, a *quid-pro-quo* kind of hand-work, for it is such a troublesome thing for me to get my fees.” Like all true and noble things, such as are well done, and such as come from the heart that is in order with eternal justice, the work of this good doctor is immortal,—and his very dust, as it diffuses itself, will be grander and better because he was clothed in it when he wrought among men.

Let me ask you to think of two other things with which you and I are entirely familiar. They are so familiar that we give them little thought,—and that is one of the reasons why I ask you to think of them now. You know we invent little inventions, we make little improvements. You and I do this and it is an admirable thing to do; we get praise for doing it; it is the fruition of head-work, the flower of hand-work. Our names appear in the papers and we sometimes become famous, which is a very pleasant thing and a thing not to be rejected. What are these inventions that we invent? What are these improvements that we make? It would not be acceptable to my present purpose to give you a description of one and all of them now. You are all familiar with such things, and I do not wish to go over them and take up your time. It is more to the point for me to say that they are invented and made to facilitate,—remember that I say now and ever,—to facilitate *our* work. These inventions and improvements enable us to bring imperilled men, women, and children from the vexing and troubling sea that always moans without pity, and place them safely upon the solid land where they can defy the tempest. These

inventions and improvements enable you and me to take from the smoke and flame and fire of danger and disaster the lives of those for whom we work. Just think of it; not for a long time, but long enough to get the idea into the cells of the brain. You certainly will not be offended if I tell you the truth? I have too much respect for your sense and your common sense to anticipate such a result as that. Let me say to you that this is one of the times when the truth must be spoken,—and spoken without reserve. Well, you have been getting a fee for your work all along; then you make an invention or an improvement, and with one or both of them you can do work quicker, easier, and better than you could before. But now you are not content with the fee you have been getting; you charge a greater fee for the same work; you know you ought not to do that, yet you do it all the same, as if you deserved it. But that is not all you do, for your ideas have expanded; you charge also for the invention and the improvement, and, what is more, you raise your fee again, because you have done your hand-work with this new piece of head-work,—this improvement on an invention or an improvement of some one else or even of your own,—so that work, expectations, and price all advance together. In this strange world of ours there is nothing stranger than this enigma, than this riddle of the fee-god.

Do you know, my friends, I am here in the most friendly way, and I know that the relation is reciprocal, that the members of my profession,—and I am trying to make you believe that you are a special part of it,—do you know that the members of my profession look upon your patents with concern and amazement? A patent is something that is open, so that everybody can see it; the patent opens the invention, the discovery, the improvement, to the world. Somebody finds out something by accident or by design, and then asks everybody to come and see it. He opens his invention, he shows everybody what it is; and everybody wants it. But this little invention, this patent thing, has a proviso attached to it. The government or the sovereign has seen it, and has given a grant to the inventor; and this grant contains the little proviso, which gives the inventor a monopoly: then he has a right to make and sell his invention at a profit, and he has also the right to put the profit into his own pocket. The patent and the right go together; and the theory is that the man has a right to his patent; that he has a patent-right to his invention; for is not his invention the product of the working of his own brain? What, it is said, could be plainer than this doctrine? Is not the laborer worthy of

his hire? Is he not entitled to his wages? Are not his wages paid for his work? And is not his invention his work? Let me state the case in this way: You work; you invent an instrument; you get it patented; you acquire a right to make and use it; it is all yours, for you invented it; and now you ask everybody to pay you for using your invention. And then I seem to hear one say, I am like the author who writes a book; I am like the artist who paints a picture; one gets a copyright for his book-work; the other gets a copyright for his picture-work. Are you an artist? Are you an author? No; you are neither. You are a dentist. We will give the author and the artist their copyrights, whether they deserve them or not; that is, we will be liberal.

Now, there is another thing that I want you to think about,—and it is really a very important thing indeed. Think about it, after you have admitted that what I have said of the other side of the question is fair and just. I have not, however, repeated all the reasons and arguments in favor of the property-rights vested in inventions; but I have stated enough to show that there is such a thing as deserving a patent-right as well as a copyright. Once more: the other thing that I want you to think about is: The attitude of the Fathers of Medicine to this question of fee, as well as this question of invention. It is a strange fact of history that the Fathers of Medicine, at least in the earliest times, did not ask for, did not exact any fees. They did their work in the best manner they knew how, and then, if any one was grateful for the service rendered, and gave a fee in recognition of the fact, they took it with thanks, not in any other sense than because they deserved it. As you know, that has changed, and we now make regular charges; we send our bills, and sometimes we collect them.

Now, as to the question of patents, what was the attitude of those into whose labors we have entered? The grants of patent-rights; the making of money out of inventions; the keeping of valuable knowledge from the profession; the extortion of gain from the people,—they, whose footsteps we follow, never could be brought to see that such things were right; they never recorded any belief in their justice; they have never admitted that such things were wise; nor did they ever put any of them in practice. In fact, they did not apply the principle of hire and wages to matters of this kind; they ever held their high office as something too sacred to be levelled to the plane of patent-rights; they were governed by principles and precepts that had a deeper meaning, a wider application, a more desirable fruition. The practice involved

in this matter may be illustrated by the proceedings of our societies of medicine and surgery,—and we believe the time is now at hand when we can include the Odontological Society in the same category. It appears—and it was and is an admirable thing—that in times present, as well as in times past, these gentlemen—this ill-used race of doctors,—I was going to say surgeons—came together and exchanged views on professional questions, and gave freely to each other of their experience and knowledge, much as you do in some other respects. These men were and are liberal, not only to each other, but also to the public. This liberality does not stop with medicine and bone-setting, but it extends to and includes the little inventions and the little improvements; they too are always freely given to others to have and use; they are not patented; for such a thing is derogatory to the dignity of a physician; it takes from the lustre of that work whose purpose is to cure and heal the sick and the injured. The inventions and the improvements of this curing and this healing art were and are cast upon the waters, and they not unfrequently return to us after many days, like that bread which was given to the poor and the needy. The Fathers of Medicine thought it wrong and unprofessional to have exclusive rights in the practice of their science and their art. We think the same, and so we practise. These principles, this practice, and this high ideal of work, are peculiar to our profession, than which there is none greater, none more beneficent. They are fortified by the dictates of altruism; they are sustained by tradition; they are attested by a long list of worthies whose work of the head, the heart, and the hand in ways innumerable overshadows all other work. I confront you, my friends, with these witnesses whose practice confirms their evidence, making them worthy and acceptable witnesses, who testify of the truth, not in the patent-office, but in the homes of the sick and the injured. They cannot all be wrong; surely their labor has not been in vain; they could not be so mistaken in the work of their lives; nor could those who think and practise otherwise be all right. Think of these high-minded men; weigh their motives; contemplate their work; estimate their success, not in the value of things that perish, but in the meaning of things that cannot be destroyed. The work of their heads was inspired by their hearts,—and is of immortal memory.

You are no longer craftsmen; your labor is not in the field of handicraft. You are no longer tradesmen; you are not engaged in trade. You neither buy nor sell. You work not as the craftsman; not as the tradesman; you work as the surgeon; in fact, you

are special surgeons. You labor among those who do the highest kind of hand-work. The position you have achieved is all your own. You are what you are, and where you are, because of your own industry; because you have used your faculties to a good purpose; because your tendency has been to emancipate yourselves from trade and craft. Let me congratulate you on your elevation; on your advancement; on the completeness of your evolution. Step by step you have risen in your work from the rudiments of teeth-extraction until you have reached the environments of a profession such as any man may profess and practise with a just and manly pride. And now I appeal to you,—and let not my appeal be in vain; let it not be as the “listing” wind which you do not respect; let it not be as the idle dream which has no substance; but let it be as to men who have eyes and can see, who have ears and can hear, and as to men who reason and can understand; and, finally, I appeal to you, as men who have worked so nobly and so well with the head and the hand, and who are competent to work with the whole heart,—in the name of science and art; in the name of justice and liberality; in the name of all things noble and true; in the name of the Fathers of Medicine; in the name of that lofty sentiment which interfuses every deed which is great and good; I appeal to you, who have shown so much good sense in the past, to put the crowning touch upon the citadel of your work by refining it with the just, wise, and true spirit of the more perfect altruism.

OFFICE NOTES.¹

BY DR. WILLIAM H. ROLLINS.

Clean Instruments.—Dental instruments should be sterilized to prevent the spread of Riggs's disease, if for no other reason.

What is the best means of rendering them aseptic? We use so many instruments in comparison with the surgeon that the matter is one taking considerable time, and unless a cheap and easy method is used the procedure will be neglected. After trying several ways used in general surgery I have adopted baking as the only practical one. A good oven which has a non-conducting covering is essential, and any of the gas cooking-stoves made by the Goodwin Gas Stove and Meter Company, answer the purpose perfectly. I

¹ Read before the Odontological Society of New York, February 17, 1891.

recommend the No. 7 as having sufficient capacity for the purpose. By testing the heat of the oven the first time, it is always easy to get the same heat again, without the use of a thermometer, by observing the size of the flame. A more accurate way would be to use one of the regulating devices in common use, but I have not yet done this. The difficulty of this method is that the wood of the handles is injured by repeated exposures to a temperature of 300° F., and this is as low a temperature as should be used. As soon as aluminum became cheap enough, Codman & Shurtleff began to use it extensively for handles to their surgical instruments. When properly plated, such handles are satisfactory, and can easily be sterilized. Aluminum is so light that it is well adapted for handles of dental instruments. It is too soft to hold the thread of socket instruments, and on this account the sockets should be made of steel and screwed into the handles. I send for inspection one of these handles which Codman & Shurtleff made for me.

Mouth-mirrors and syringes are difficult to keep aseptic. The former deteriorate rapidly. I have used on an average one a month. During the time I have tried to keep clean instruments, and, on applying to the S. S. White Company, to see if anything could be done to make them more durable, I got no satisfaction, being told that a mouth-mirror should never be washed nor heated,—simple wiping being all that was allowable. Imagine using an instrument in a patient's mouth that has been simply wiped! In syringes the leather soon gives out, and to avoid this I have my syringe pistons made of brass, with hard rubber or other split rings like those in a steam engine. There should be four rings to insure a sufficiently tight piston. Such a piston is not as tight as a new leather one, but the fact that one of mine has been in constant daily use for three years shows that, for the ordinary washing out of the cavities in teeth, it is good enough. The rubber itself does not seem to wear, the wear coming on the metal of the syringe. These syringes can be had of Codman & Shurtleff.

Electric Action from Amalgam.—Seven months ago I put a gold crown on an inferior molar. The back of the bicuspid and the adjoining tooth had both been some years previously filled with amalgam. As the patient did not return to town till late, I did not see her again until December, when she came in for a moment complaining that the cap cut her tongue. As she was ill, I did not examine her teeth at this time, simply polishing the surface of the crown next the tongue, though I could not find any special roughness.

About two weeks ago the patient, who was very ill, sent for me. The entire membrane of the mouth was congested; there was an increased flow of saliva; and on the tongue opposite the gold cap there was an ulcer. She was unable to take any nourishment except milk, on account of the soreness of the mouth and tongue, and was suffering such pain in the ear that sleep without medicine was impossible. I gave her a soothing wash, and soon thereafter examined the teeth carefully.

There was a silver-colored spot on the gold crown where it came near the amalgam. In several short sittings I removed the gold cap and the amalgam fillings. In a week the flow of saliva was diminished, the mucous membranes of the mouth were normal in appearance, and the ulcer had healed. The pain in the ear has not yet entirely gone.

Whatever the explanation may be, the case shows that, under certain circumstances, the use of amalgam is not desirable. Certain abnormal general conditions of the system may make a patient more susceptible to the presence of these fillings, especially where there are other metals in the teeth.

I hope to examine the silver-colored spot on the gold cap, and shall then be able to express an opinion. I have delayed the examination, as I wished to show the cap as it was in the mouth.

I tested the parotid saliva twice in this case before removing the fillings and found it acid. The patient has been, and still is, suffering severely from gout.

I send on the gold cap for the inspection of the members of the Odontological Society.

Acid-Washing of Amalgam.—Most of the makers of amalgam alloy state that alloys should not be washed, and many dentists follow their directions. Then there are others who use either alcohol or bicarbonate of soda, and wash with these.

A year ago I suggested to Dr. Russell, whose alloy I use, that he should bring my method of acid-washing to the attention of dentists, but as I have not seen the method in print, I wish to bring it before the Society, as it makes amalgamation easy and gives a clean material, which is also stronger than an unwashed amalgam.

I keep, in a convenient place, a solution of sulphuric acid in water, one part in fifty. A little of this is poured into a small glass mortar, enough of the alloy put in and worked for a moment with the pestle; when the alloy is perfectly clean, shake in the required amount of mercury and rub together. Amalgamation is almost immediate. Pour off the weak acid, and wash in a few changes of

water, then dry and use. Sulphuric acid is a convenient acid for the purpose, as it can be poured into the waste pipe without danger, and it forms soluble salts with the metals of the alloy.

Warm Instruments.—No dental instrument should be used at a lower temperature than the blood. This may seem a small matter, but constant daily use has shown me that it is a source of comfort to patients. It is necessary that the means used to warm the instruments should be simple and automatic, otherwise it will not be done. I have a closed copper vessel with flat top, measuring twenty by thirty inches, by one inch in depth. In one corner of the upper surface is a small upright pipe like the neck of a bottle, which is closed with a cork. This flat vessel covers the top of my operating case, one end projecting enough to allow a gas-burner to be placed under it without risk of burning the wood-work of the case.

Before use, the vessel is half-filled with water and the cork put in. A simple automatic regulator turns down the gas when the temperature has reached the proper point and maintains it there all day. I select the instruments to be used, and put them on the pan, where they warm in a few minutes. In addition to the instruments, six small glasses of water are kept on the closed pan; in one of these is a small chemical thermometer, which shows that the temperature is right; in another I keep the syringe for washing out the decayed cavities. The other glasses are for the use of patients in rinsing the mouth. If for no other purpose, it would be worth while to have such an apparatus to furnish a supply of properly warmed water without any care or attention. There is, moreover, not the least doubt that properly warmed instruments hurt less than when used at the temperature of the operating-room. My warming vessel was made by Peter Gray, 12 Marshall Street, Boston.

During the twelve years that I have used warm instruments I have converted one dentist to my way of thinking; but the importance of the matter should not be judged by the number of converts.

New Preparations for Dental Use.—I have prepared an arseniate of cocaine which has some good points in treatment of the dental pulp. Applied to a pulp which is to be destroyed, it accomplishes this without much pain. In a weak solution it diminishes the sensibility of dentine.¹ I have a few cases under observation on which I

¹ This statement cannot be published without a protest. The use of arsenious acid and cocaine in combination to reduce the sensitiveness of dentine can have but one result, the destruction of the pulp. This question was settled years ago, and it is remarkable that it should be again revived.—ED.

hope to report in a year or two, but if it could be tested on sensitive dentine in hospital practice the cases would be so much more numerous that definite information might be had in a shorter time. In private practice it is not desirable to try it as an obtunder except in certain teeth, like bicuspid or others that are to be removed for regulating, for it might endanger the vitality of the dental pulp. I have asked Theodore Metcalf & Co., Boston, to prepare some of the arseniate in case any dentist should wish to experiment with it.

REMOVAL OF THE PULP BY THE USE OF COCAINE.¹

BY EDWARD C. BRIGGS, M.D., D.M.D.

THE operation I am about to describe I have never seen mentioned; as far as I know, it is original. At all events, to any who have not discovered it it will come as a blessing, for it does away with one of the most troublesome conditions with which we are called upon to deal.

Briefly and to the point, it is the removal of the pulp by the use of cocaine. The method and detail of the operation I can best bring out by describing the cases upon which I have operated.

CASE I.—Mrs. M. came to me in May with an aching pulp in the left superior second bicuspid. I found an exposure, and dressed it to reduce the inflammation. After a few days, the tooth being comfortable, I applied arsenious acid to destroy the pulp. It acted in the not unusual way,—that is, it caused a violent inflammation.

When I saw the patient May 17, 1890, she was suffering terribly. After I had applied local anæsthetics without producing any effect, I partly anæsthetized the patient, to give her, at least, temporary relief, and took the opportunity to apply more closely and exactly to the pulp an anæsthetic. When the patient came out of the anæsthesia, the tooth began to ache again with redoubled vigor. It was then that it occurred to me to try to *inject* my solution of cocaine into the pulp. I had, of course, previously applied it very freely. I therefore took my hypodermic syringe and filled it with a twenty-per-cent. solution of cocaine, and, pressing the

¹ Read before the Harvard Odontological Society, Boston, Mass., October 23, 1890.

point firmly against the opening into the pulp, slowly injected it. At the first pressure there was a slight start; but, waiting a few seconds, I was able to force the quantity in the syringe against the pulp with considerable pressure, the excess, of course, escaping around the point. This force I consider a great factor, for I do not think the cocaine goes into the pulp, but is carried by the pressure of the piston up around that organ. In the case I am describing, the pain ceased immediately.

It occurred to me that perhaps there was more than cessation of pain, that perhaps I could now remove the pulp. This was found to be the case, and it was removed without the patient feeling any pain.

I immediately communicated this fact to Dr. Hamilton and Dr. Charles Briggs, urging them to give it a trial. I hope to have them relate their experiences to you to-night.

CASE II.—A. M. had been an invalid for two years, in such a state of health as to prohibit any dental attendance. When I saw him in March, he had an aching right superior first molar. After removing the decayed and softened dentine, except a thin layer over the pulp, I dressed the tooth and dismissed him. He came again, by appointment, May 28. He then informed me that the tooth was more or less troublesome all the time. Feeling that it was useless to temporize with it, I removed the dressing, and with a slight movement, with spoon excavator, exposed the pulp. I could just get the point of the syringe through the opening. Before injecting, I applied on cotton some of the cocaine, so that putting the syringe-point in did not occasion pain.

Here, again, I began slowly to inject, and, after the first slight start, there was no more feeling while injecting. In the last half of the amount in the syringe I pressed the piston down rapidly.

The cavity being distal, and somewhat inaccessible, I took my engine, and with this instrument went down through the crown and removed the entire pulp without further sensation. Not having the time, I did not fill the roots, but gave the patient another appointment. This I found to be a mistake, for when the patient came again, I had great difficulty in getting into the roots. Although I had seen the entire pulp on the broach, the root-canals were as sensitive as though the pulp was still there. This I have found to be true in other cases. I now, therefore, fill the roots before the benumbing effect of the cocaine upon the nerve-fibrils has passed off.

The very fact that these are not destroyed, as is the case with

arsenious acid and other caustics, is greatly in favor of this method. The tooth in this case is not at all *dead*, it is only pulpless.

CASE III.—In this case I was ready to put on a gold crown over a much broken-down third molar, when I found the pulp ought to be exposed; accordingly I opened into it and injected the cocaine, removed the pulp, filled the roots, and put on the crown, with no other pain, then or since, except a slight sensation when the pulp first felt the impact of the cocaine.

CASE IV.—This patient had a fall, striking on the front teeth. The left superior central incisor was broken off, exposing the pulp. This was destroyed with arsenious acid before I had begun the use of cocaine. In June last I discovered a little discoloration of the right central, and, drilling into the pulp-chamber, obtained a drop of pus, but found the pulp beyond alive. Treated it the same as former cases, and there was little or no pain.

CASE V.—This was one of those pulps which, having been capped, behave well for a year or so and then begin to die. I opened into the pulp-chamber, washed out the decomposed portion, fitted the point of syringe, wrapped with cotton tightly in the opening, and injected as before described. The pulp was removed with a barbed broach and the root filled.

CASE VI.—This was a case that had been under treatment for some time. There was life in a portion of each root, which resisted the action of arsenious acid. The cocaine was forced into the root, causing no more pain than would be felt by the exploring probe. The troublesome remnant was removed, and the canals filled without further pain.

CASE VII.—This was a superior third molar, which had ached badly before patient came to me. Found an exposure, forced the cocaine in, removed the pulp, and filled the root, without the patient fully grasping the fact that I was doing more than the ordinary excavating for simple cavity.

CASE VIII.—Case similar to Case 4. Young man with delicate teeth. Right superior central incisor had small gold filling in mesial, put in before I saw him, and small gutta-percha in distal. The patient's mother discovered discoloration, and sent him in to see me. I drilled and got pus, but found pulp in root alive. Injected cocaine, removed the pulp, and filled root, causing only a little pain. Patient said he "did not mind it."

CASE IX.—History of an old exposure successfully capped for some years. Gold-filling had broken out, and caries had again endangered pulp.

After removing the pulp, by means of cocaine, and filling root, patient expressed himself as having had the easiest time he had ever experienced ; which simply indicates that the treatment could not have been very painful.

CASE X.—This patient lives in New York. Once a year I had dressed an old exposure in left superior first molar, which had resisted arsenious acid in former times. This pulp I disposed of in the morning, and filled the roots. In the afternoon put in a large mesial-crown gold filling ; no trouble then or since.

CASE XI.—This patient has delicate teeth. An ordinary summer absence will develop a cavity reaching the pulp.

This time it was a buccal cavity in left superior second molar. This could have been capped, but, knowing the irritability of the pulps and the danger of new decay undermining the dressing and undoing my treatment, I decided to remove the pulp.

By careful cutting with spoon excavator I obtained a small opening to the pulp with no more pain than might occur in ordinary excavating. Got the point of the syringe firmly fixed in the opening, held it steady with both hands, and then asked the patient to press the piston down and to stop when it hurt him. He stopped once when he had pressed down about a sixteenth of an inch, but started on immediately, evidently not considering himself much hurt, and pressed clear down. I opened the pulp-chamber from the crown, removed the pulp without causing any pain, and filled the roots.

There is one point to be mentioned which has not been brought out in cases cited, and that is the excessive bleeding after the injection of the cocaine.

This is sometimes a matter of considerable annoyance, delaying the filling of the roots.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular meeting at the Academy of Medicine, No. 17 West Forty-third Street, New York City, on Tuesday evening, February 17, 1891.

The President, Dr. William H. Dwinelle, in the chair.

INCIDENTS OF OFFICE PRACTICE AND CASUAL COMMUNICATIONS.

The President.—Under this head, we have a communication from an associate member of this society, William Herbert Rollins, M.D., D.M.D., of Boston, which the secretary will please read.

Dr. George Wilson, the Corresponding Secretary, read the paper from Dr. Rollins, entitled "Office Notes."

(For Dr. Rollins's paper, see page 292.)

The President.—If no one is ready to discuss Dr. Rollins's paper I will introduce the speaker of the evening, Professor J. S. Wight. The subject of the essay is "Work," with which we are all familiar.

(For Professor Wight's paper, see page 284.)

The President.—Gentlemen, we have all listened with pleasure to this address upon a subject which interests us so deeply, and I now invite discussion upon it. If we should call upon those who have most distinguished themselves in work, according to their age, I suppose we would call upon our worthy friend, Dr. Atkinson. I do not know any one who could respond better than he.

Dr. W. H. Atkinson.—It is not my fault that I am old; it is my fortune that I am young in aspiration for truth and excellence; not for myself, but, as the closing sentence of the paper we have listened to indicates, the work worthy to be done is not for ourselves, but for others.

Where do we stand, as compared to the work that has been commended so highly to us, that was initiated by the men called "the fathers of medicine?" We stand on vantage ground to them in everything respecting the history of medicine; but we do not stand one jot ahead of them in the position of the attain-

ment of any knowledge, for they, as the Scriptures tell us, got all they have through the inspiration of the Almighty, that giveth man understanding. If what we call understanding were legitimate understanding, and endued us with the power to bring to pass the good we aspire to, then indeed might we seek for a syllabus that should be capable of being taught with mathematical certainty, so as to know when we went against it or when we coincided with it. Any one who facilitates the return to health from illness is a healer, to the extent of the work that is done in that regard. My nature rises up always, I do not know but wickedly, against the assumption that there is higher work than handicraft; that there is higher work than the cultivation of the soil; that there can be a more legitimate exercise than the preparation of food, raiment, and shelter; and I do hate the division that says there is a difference between workers at all, and that it is legitimate to make a difference, and call certain workers professional men, and other workers mechanics, etc.

There is a mechanism in everything that is executed; if we knew how beautiful the nutrition of the gray matter of the brain appears under the impact of the desire to know, we might say that we understand something about mental activity, something about moral relation, and about what makes us happy when good results follow our efforts, and miserable when we have inflicted wretchedness on our fellows. I suppose you think I am a preacher, too. It is good to preach when you have anything to say; but how shall they be taught without a preacher, and how shall they preach unless sent? I was not sent; but I was called by the chair to speak, and the subject is so great, so manifold, and so involved that I tremble before it whenever I think of speaking about that which is normal and that which is abnormal, and how they can be regained after they have been lost.

All that we do is involved to such an extent as to make it necessary that we do not teach by preaching alone, but by exhibition of the works that we do, and until we curtail didactic instruction we will not make much progress. Does that say that we have had no progress? The faces in this room show we have had progress. How did we get it? Not by following text, but by showing what we could do, each to the other, and inquiring each of the other how he did certain work; and thus have we gone on, until this blessed day of light, that enables the humble dentists to do more for the comfort of age than all the other professions that have preceded it, —keeping their digestory organs in good condition, by intelligently

understanding the laws of life, and, as Dr. Holmes so beautifully said, "it has annihilated age."

The President.—I hope this discussion will continue. Dr. Jarvie, we would like to hear from you.

Dr. William Jarvie.—I do not know that there is anything I can say to add at all to the interest of the meeting. The paper is of such a character that I do not think any one can antagonize the statements it contains. I am very much impressed with the title of the paper,—“Work,”—the desirability and necessity of work. It is by work that we progress; it is by work that we grow; it is because of work that we, as a profession, are not where we were twenty years ago; and it will be by the constant application of that word that this profession will continue in the advanced position that it has been assuming during the past many years.

The President.—Dr. Davenport, I am sure you have thought a great deal on this subject; we would like to hear some of the products of your thoughts and conclusions.

Dr. S. E. Davenport.—I am afraid. Mr. President, my thoughts have been directed more to the latter part of the essay, to the extremely practical portions, with which I am greatly in sympathy, where we are urged not only to do our work for the good that may come from it, without special thought to the remuneration to be received, but also that we shall not place an unusual or a higher value upon our services, even though we may have been given a certain ability, perhaps above our neighbors, in improving certain methods or appliances for the relief of distress.

The essayist has perhaps not been able to follow the drift of the question of patents as it has come before this Society in the past year and a half, but I feel sure that the missionary work in both word and deed which has been done by several prominent members of our specialty has enabled us to progress largely in the right direction. I know there are several members of this Society who in the past few years have made valuable contributions to the art of the profession, and who for reasons they thought to be good at the time did patent them. I believe they have since made up their minds that the reasons governing that action were not sufficient, and that to-day the products of their minds are given freely to the profession.

I feel under obligations to the essayist for admonishing us in the very pleasing way he has, and I think it deserved, for I am afraid we think too much of fees, and particularly as the term fee has become so common. We are apt to feel that services rendered,

no matter of what character, must be followed by the receipt of a fee for the time expended, reasoning with ourselves that our time is just so valuable. That may in a measure be right, but surely the success of the operation, the character of the services rendered, and the ability of the patient to pay should have more to do with the size of the fee than any iron-clad rule which we may make.

The President.—We would all like to hear from Dr. Howe on the subject.

Dr. J. Morgan Howe.—Mr. President, I have been very greatly pleased with Professor Wight's essay, but I will merely discuss for a moment that portion of it which makes the greatest impression on my mind, and it is the thought he has presented of the dignity and importance, the inherent nobility, of work.—of the heart, of the head, and of the hand. More than once during the past few years I have thought of the future of dentistry. It has occurred to me that the young men who are coming forward to practise our art may have less interest in the work to be done for its own sake, and for the sake of the good it would do those for whom it was rendered, than for the remuneration that was expected to be received. It seems to me that the thoughts of the essayist which are directed to this point are of great importance not only to those of us who have heard them, and those who will read them in the larger circulation of our transactions, but also to the young and coming generation of dentists who will soon take our place. Unless a sentiment of pride and interest in the work which they are to do for the sake of the good it will accomplish, and of pride in the perfection to which they can bring that work aside from the fee, can be cultivated to a greater extent than I fear it has been, the work of the coming dentist will not take rank with that of our honored president, and some others whom we might mention.

Of course, all who have heard me discuss the question of patents know that I heartily endorse what I understand to be the position of our essayist on that point.

The President.—This subject is increasing with interest as we discuss it. I knew it would. We would like to hear from Dr. Perry.

Dr. S. G. Perry.—I can only commend the spirit of the paper, as we know it is our habit to have papers that are specially directed to the discussion of special subjects, and it is interesting to have a paper of this kind in which occur so often the well-known, old-fashioned terms of goodness, honor, virtue, justice, altruism, and terms of that sort, that after all should be kept well before our minds in

these modern days of work. In the haste of the materialistic and industrial age in which we live it may not be strange that they sometimes are forgotten.

I do not know whether I can altogether agree with Dr. Howe as to the coming members of the profession. There is this to be remembered: that there are but a few mountain peaks, and there never will be many again. There cannot be in the nature of things, for the valleys are rising. It is a very hopeful sign, it seems to me, that the younger men are working and lifting the valleys, as one might say, though they are working slowly, and many are not yet heard from. I have great faith in the coming generation of dentists. I often see work from distant towns from the hands of men whom I have never heard of before, that I look upon with surprise. I am sure throughout the country there is a higher standard than ever existed before, and if it is an industrial age in which we live, and one in which it would seem that morals are not cultivated, and in which luxury abounds, yet, on the other hand, we hear of the bad and not of the good. I believe with Emerson, in his last essay on the "Republic," that things are bettering and that that is the inevitable tendency. It certainly applies to our profession, and no one can notice it so well as the older members of the profession. I can sympathize with Dr. Atkinson when he lays so much stress on the changes that have occurred in his time, and I listen with much interest to his hope in the younger men, for my opinion is that the dental profession has more before it than back of it.

As to the subject of patents, I think there can be no doubt as to the future of that question. I do not for a moment believe that the dental profession will tolerate in the future the taking of patents, unless it be for the purpose of protecting devices from those who would patent them and monopolize them. I am not sure but that to take a patent for the purpose of protecting it, so that it can be presented to the profession, may be wise sometimes, but that the patentee should profit by it, will not, in the course of a few years, be tolerated by the profession.

I have had something to do with it, and I regret nothing in my life so much as that; but I did it with such light as I had at the time, and with little profit to myself.

The subject of fees has been spoken of. I think fees are individual. I do not believe that any just law can be laid down that will apply to all alike. I have never charged very high fees, because to this day I have not had a very high opinion of my work. It constantly falls below my ideal, and I have never been

able to bring myself to the point of thinking that it is worth so very much, and if it is not worth so much, then I cannot charge for it. I do not, however, advocate or defend low fees, for it is evident that to charge a higher fee is very likely to lead a dentist to appreciate more fully the importance and value of his work, and perhaps lead him unconsciously to place the real value on the organs upon which he works. It is well to let the mind dwell on the fact that the teeth upon which we work are of immense value, and that everything we do on them is worthy of the strictest care and closest attention to all minute details,—that it is not boys' play, nor work for children. But it is work worthy of the best efforts of the best men that ever lived.

The President.—Dr. Bogue, we would like to hear from you. We know you are well acquainted with the subject of the essay.

Dr. E. A. Bogue.—Mr. President, I do not quite know which of several meanings to put on that little friendly remark. If it means that I am well acquainted with digging, yes. As I listened to the essayist, I could not help agreeing with his views with all my heart. Neither could I help thinking to myself, how little, after all, one in a kindred calling can see into our work. When he came to speak of the question of fees, I thought of the rule which has been mine through life, and which, I believe, is supported by most of the gentlemen present. This rule is to ask myself, first, "Can I afford to take this patient?" If the patient is accepted, the question of fee is dropped, and then the question comes, "What is the best thing that can be done for this patient?" And with that thought in mind, I have been proud to see the manifest advance which has been made in our handiwork; for honest work shows the thought that is behind it. No longer ago than last evening I heard a lecture on Egypt, and the lecturer said that people who did such work in their architecture could not have been dishonest people; they must have been true to the interests of life; they must have had truth as a basis for their work.

Let me show you an example of that to-day. A few months ago I wanted a sixth-year molar to transplant, and I sent to all the extractors I knew anything about. Up to now I have failed to procure it, but I did receive a letter the other day from a gentleman, saying that a little while ago I could have gotten all the good sixth-year molars I wanted, but now it is impossible to obtain them. My delight at not being able to get what I wanted may be imagined.

In regard to this question of patents, which causes some of our

friends to hang their heads a little, I hope they will also remember that we are vastly different from what we were a few years ago.

Illustrating that, perhaps I may allude to a little incident. At a dinner in France, given to one of the officers of this Society, the president of the French society made a few remarks, and alluded pleasantly to the Odontological Society, and what we had done for them. In my answer I said that thirteen years ago graduates of the French college of medicine had refused to let their own apprentices and associates stand by the operating-chair to see their operations, because they wished to keep them secret. For my part, I believed I had been into the most secret recesses of many of the best dental offices in France, with the full knowledge and consent of the doctors after informing them that I should publish any specially good thing that I might find. The answer came very quickly, "Yes, you have been to see our processes, but only because you and your friends permit us to see yours." The same illiberality which I saw thirteen years ago in France Dr. Straw told me existed here about twice that length of time ago. I think gentlemen in the room may certify for or against it. We are developing; we are growing; and while there is much room to develop, I hope the good advice we have received this evening, and in which we can all fully agree, will not be wasted.

Dr. Perry.—A very eminent man, some time since, expressed to me the thought that as art loses its repose, it enters upon its period of decadence. I am inclined to think that this is a fact of universal application. Of course, the idea he wished to express was that the greatest works of art conveyed the thought of repose, and that if that restfulness and repose were not conveyed, that they were on the downward path.

I see one fear, one need, and that is in this hurried age we do not have that repose which is necessary for perfect work. If that could be more fully realized, and if we could never be induced to hasten or hurry,—and I speak with feeling on this subject, for my life has been too busy,—we should attain better results with less wear and tear of mind and body. It seems to me that one of the deductions that can be fairly drawn from the paper of the evening is that restfulness and repose are only other words for truthfulness in work.

Dr. Lord.—I think we have all been interested in the paper that has been read to us, and we will all leave this place feeling that we may be the better for it. We cannot but be impressed with the most delightful, earnest spirit of the essayist, and I move

you, Mr. President, that we pass a most hearty vote of thanks to the essayist for his very interesting and suggestive paper.

Motion seconded and carried.

Dr. Atkinson.—I have a word to say about this idea of repose when thoroughly understood. I agree with Dr. Perry, but I have noticed that when we were doing our best work, there was an enthusiasm that came over us, which gave us illumination and ability before unknown and unattained, so that if we are in the spirit of comprehending the principles involved, and executing the work in hand, we will make progress against that kind of stillness or quiet of repose, as generally understood. It is being swallowed up, so that the individual no longer stands out as a worker, but he is part and parcel of the work, just as the drops of the sea are of the infinite ocean, without distinctness of manifestation.

Personally speaking, I feel that I do not know the lapse of time, or anything as to the consequences that in my best mood invoked my most enthusiastic efforts in doing the work. But that is progress. It is made for me.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,
Editor New York Odontological Society.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

(For paper of Dr. Chupein, see page 213.)

Dr. F. M. Dixon.—I must take exception from beginning to end to Dr. Chupein's paper, and I do it with all kindness.

This question, Mr. President, I thought had been talked to death, was dead and buried; not because it was unimportant, but because I believed dentists had made up their minds that it was a subject requiring an amount of judgment which every man does not possess, whether the sixth-year molar should be extracted or whether it should not be; or whether it should be extracted at a certain period. Now, my impression with regard to this tooth is—I say it honestly—that it is one of the most important members of the human mouth. It is the broadest on its grinding surface, and it occupies the central position among its fellows.

Why should it be extracted when there are teeth in the mouth that are not worth one-fourth what the sixth-year molar is, simply

because the grinding surface is such that they cannot be brought into place as the sixth-year molar can? We cannot always judge whether we should keep it there until all the teeth are in place and the child, or young man or woman, has grown to maturity, for it sometimes happens that when the sixth-year molar is extracted the teeth do not come together.

Not in one solitary instance do I recollect having lost a first molar in practice, which now, I am happy to say, I never think of extracting. The difficulty in saving this tooth is that it is not taken in time. If I fill a sixth-year molar when the cavity is small, and the filling should fail, it is a serious matter to be obliged to fill it again. As it is the most useful tooth, is it not worth the trouble? If sometimes it is necessary to extract a tooth, why must we take the best and most useful in the mouth instead of one less important? Very often the cervical margin of the first molar and second bicuspid come together more tightly than at the upper surface. Then I say, if necessary to extract a tooth, why not take the second bicuspid? and then will be left a perfect set of teeth.

I should like to hear from some of the other members.

Dr. G. L. S. Jamison.—I feel that it would be rather a difficult task for me to speak at length after Dr. Dixon, and I feel rather out of place. Of course my experience has been more limited than his, but I might say that, limited as it is, I quite agree with what he has said. I firmly believe that the sixth-year molar is one of the most useful teeth.

This afternoon about the last patient I saw in my office was the case of an improper extraction of a sixth-year molar, causing a deformity of the young man's face. He called my attention to it. He said that the left side of his face was much fuller than the right side. I examined the mouth and found that the sixth-year molar on the right side had been extracted, and that the teeth had grown in such a manner that occlusion was not by any means perfect. Altogether the young man could not experience any satisfaction, and naturally avoided chewing on that side of the mouth, and, as he was a rather good liver, I presume the muscles on the left side were unnaturally developed, causing a deformity in the young man's expression.

If this tooth is to be extracted, it should be done before the eleventh year if the circumstances are such as to warrant it, for the simple reason that if it is left in position until the eleventh year it will soon be followed by the twelfth-year molar, and already probably this molar has made such progress that its position will

not be directly in the place of the sixth-year molar, as it would be had the latter been extracted when the patient was possibly eight or nine years of age.

The essayist laid great stress on the fact that the sixth-year molar was the cause of general decay. Now, that has not been my experience, and it seems to me that if a patient is put in your hands before he is eleven years of age, that by filling and refilling, if necessary, this tooth can be kept in position and can be made serviceable and can be saved as long as any of the other teeth in the mouth. I have seen a great many of Dr. Dixon's patients, through his kindness from time to time. I don't believe that he has in many cases ever advocated the extraction of the sixth-year molar, except when he could not possibly save it by filling.

As far as I am personally concerned, from my limited experience, I would say that it is better to sacrifice either the first or second bicuspid rather than the sixth-year molar. Of course it is a subject that requires great judgment, and there are many circumstances to take into consideration, but I am in favor, on the whole, of retaining it and sacrificing some other tooth.

Dr. E. C. Kirk.—If I apprehend Dr. Chupein's position exactly, I understand him to advocate the extraction of the sixth-year molar in a majority of cases as a prophylactic measure against the decay of other teeth, and claims the advantage that decay by contact with other teeth is thus avoided.

In general I am thoroughly opposed to the practice of extracting the sixth-year molar for such purposes. It does not seem to me to be the right line in which to expend our energies towards obtaining prophylactic results, so far as decay of the teeth is concerned. I see no reason why the sixth-year molar should decay sooner than the other teeth except that it is exposed to action longer than any other tooth, and if it is properly taken care of there is no reason why it should be more vulnerable than others. I believe the gum margins in such cases more than balance any good we get from the retardation of the process of decay. Therefore, as a prophylactic measure, I would be opposed to it. Of course there are individual cases where the sixth-year molar could be extracted to advantage; cases of peculiar irregularity where the teeth are so damaged that it should be taken out the same as any other tooth, and not because it is the sixth-year molar.

I thoroughly agree with Dr. Dixon that it is the most valuable tooth in the denture. I think I have nothing more to offer on the subject.

Dr. L. Ashley Faught.—Some years ago, at a meeting of the Pennsylvania State Dental Society, I read a paper on "Oral Hygiene." The gentlemen gathered at that meeting were very much on the lookout for mistakes, and some of the papers that were read were pretty severely handled, and when my turn came to read my paper, I had considerable doubt as to whether I would read it or not, considering the fact that I had taken the opportunity of saying something in regard to the sixth-year molar. I thought it might possibly prove a point of attack for those who were looking for victims; but I had a redeeming clause in it, it seems, and they let it alone, and that redeeming clause was: I would extract the sixth-year molar *for cause*; and that seemed to save my head at that time. Nevertheless, I am surprised that we should discuss to-night the matter of the extraction of the sixth-year molar, and that any one who has had an opportunity of viewing mouths and examining diseases of the teeth should desire the retention of this tooth in all cases. The only thing that I can say for those who favor its preservation under all circumstances would be that they have not examined mouths where the sixth-year molar had been extracted. If they had had an opportunity of seeing this extraction done as I believe it ought to be done, I think they would feel the same as I do in regard to it,—that it is a benefit.

I must say that I do not believe in the wholesale retention or removal of the sixth-year molar in all cases, under all conditions, and under all circumstances, but still adhere to my original statement,—for cause. I think there are some mouths where it would be highly injudicious, and I think many times it is the best thing for the patient.

I have seen case after case in my own practice where the removal of the sixth-year molar was indicated, as when the twelfth-year molar is beginning to make its eruption. I believe that if the sixth-year molar is removed at that time, under almost all conditions, unless there be some other mechanical influence exerting its power upon the tooth, that the twelfth-year molar will come forward without turning or disturbing the normal occlusion of the teeth.

That is my position in regard to the sixth-year molar. I believe it to be sound practice, and believe that great good can be done to our patients.

(Question asked as to what is meant by the clause *for cause*.)

It is hard to describe to another those particular things which you would recognize. I am in the position of the judge who gave

his timid young friend coming to the bench this advice: You are going to be called on to give your opinions; in doing this, never give your reasons, because in nine cases out of ten your opinions will be right and your reasons wrong.

With judgment, care, and watchfulness, we recognize that under certain conditions certain things are intended, and we know that with due attention good results will follow. It is impossible to transmit that acute knowledge from one person to another.

The President.—Give a typical case.

Dr. Faught.—Well, if I had a sixth-year molar largely broken down in teeth that would have a tendency to disintegration, showing a weak structure, coming on to that age of life in which perhaps one or two of them are involved in trouble, I should have no hesitation in removing the sixth-year molar. I believe that in such a case the extraction of the sixth-year molar will give you, instead of a bicuspid and small wisdom tooth in the arch, which is of very little use, a twelfth-year molar in good position, and the other molars will also develop and come forward to do the same service.

Dr. S. E. Gilbert.—The only thing I can say is that a man must use his brains. There are cases that I have seen where the extraction of the sixth-year molar, and also its retention, was very beneficial.

I have a case in mind now where the extraction of the first permanent molar has run through a whole family. I cannot express the terms that that family can use in disapproval of it, for the reason that it was extracted at the wrong time and the teeth stand in irregular position.

As Dr. Kirk has said, there is more injury to the gum margins than will be benefited by removal. I do not believe in separation. I have had considerable to contend with from teeth having been separated by filing, and if there is any nuisance in a man's mouth it is that. I do not like to say anything against another man,—in fact, I will not of a legitimate practitioner,—but it is pretty hard work to smooth over this mode of practice.

I do not believe in the wholesale extraction, neither in the wholesale retention. You must use your judgment. There are some cases where, if they are removed, it will save an immense amount of trouble afterwards. In my own mouth I believe the denture would be in great deal better shape if the sixth-year molar had been removed at the proper time.

Dr. Rehfuess.—I am pleased to hear this paper of Dr. Chupein's, and I feel gratified to have heard the different speakers condemn

the extraction of the sixth-year molar as an invariable rule. Of course it is recognized, as the previous speakers have said, that at times its judicious extraction is a benefit, but it is difficult to recommend this operation.

The sixth-year molar is understood to be the connecting link between the first and second dentition, and I think it would not only be malpractice, but wilful malpractice, for any one to presume to extract the sixth-year molar previous to the twelfth year; because we know that between the seventh and ninth year, or even as late as the eleventh year, the sixth-year molars are the only teeth that are in place for masticating. It brings the anterior teeth in occlusion, and deformity results,—unnatural pressure on the upper teeth by the lower, which causes protrusion of the upper teeth.

Now, the authorities that favor the extraction of the sixth-year molar say that the time to do it is just previous to the appearance of the twelfth-year molar, and that prevents tipping; but when this is not done we should let it alone until the eruption of the wisdom teeth, so the space will close up.

In addition, I might say that I disagree with some of the authorities that the sixth-year molar, in texture and quality, is inferior to the other teeth in the mouth. That is, from a limited experience; but still I have noticed that the second bicuspid decays oftener and more frequently than the sixth-year molar; and I also agree on that point with the previous speaker, that if any teeth are to be extracted, I would sacrifice the second bicuspid in preference to the sixth-year molar.

Dr. Gilbert.—I have a son who is not eleven years old, yet the twelfth-year molars are thoroughly formed, and they have half their length exposed. I think it would be rather late to extract. I think Dr. Faught's idea of extraction is nearer the proper time.

Dr. Reh fuss.—I think it ought to be extracted previous to the twelfth year. In speaking of the twelfth year, I was speaking of the authorities who are in favor of extracting the sixth-year molar.

Dr. Kirk.—I would like to ask if any one has ever seen a case where the extraction of the sixth-year molar does not make a difference in the appearance of a set of teeth, and if it could not always be told that a tooth had been extracted by the appearance of the space and the gum margins, etc.? I have never seen a mouth where the tooth has been extracted and the space closed up, but that the gum festoon looked different. There is also nearly always some little tilting forward of the twelfth-year molar.

I have pursued, at one time, the extraction of the sixth-year molar as a prophylactic measure until I convinced myself that I was on the wrong track. I have tried it, and I speak of it as the result of my experience in my own work and what I have seen in the mouths of patients who have come from other dentists; and where I extract now it is for the correction of some special irregularity, not with the belief that it will prevent caries; and for the first reason I extract the second bicuspid as frequently as the sixth-year molar.

Dr. Chupein—I have observed it more in the lower jaw than in the upper. I have seen it in the upper jaw where it would be impossible to detect whether the first molar had been extracted.

I would say that I rather object to waiting as long as Dr. Faught did for the eruption of the second molar pushing through the gum before permitting the first molar to be extracted, and I think it would be preferable, as soon as we notice a little swelling, indicating that the tooth had not yet quite protruded, to extract it, rather than wait until it has come through the gum thoroughly; but if you extract it before that time it will come forward until it will nearly occupy the position of the first molar.

Dr. Ambler Tees.—I must say that I approve a great deal of Dr. Chupein's paper. Many years ago I tried to save these teeth, and filled and refilled, and patched up the mouths of my patients, but for many years I have changed my tactics, and it has been my practice to order the extraction of the sixth-year molar, when proximal decay is much advanced, at eleven years of age, and I do this at this period to avoid the tilting that has been spoken of by several gentlemen.

For instance, if the lower molar shows proximal decay, I order its extraction at the age mentioned, and I also order the extraction of its antagonist, whether it indicates decay or not. I do this to give perfect occlusion.

Several years ago a young patient from one of the boarding-schools was sent to me to have two devitalized lower molars treated; the crowns were half decayed away. She was a young lady about sixteen years of age. From my experience I knew that those teeth would have to come out, and that in a very short time. One of the lady teachers at the school came with her. She said, "Now, doctor, we have been ordered by the dentist in New York to come to you for the treatment of those teeth. He has been treating them for some time, and recommended us to you to continue it." I told her then that my conscience would not allow me to continue

the treatment; that I would either have to send the patient back, which was almost impossible, or else refuse the case. The daughter said, "We have been sent to you, and now we are going to let you do as you think best." I told the young lady that the best thing to do was to have the teeth taken out. She said she wanted to place herself in my hands, and she insisted on my doing the work. This I did, and treated and filled the other teeth. The first of July I sent my bill to her father, and on returning from my vacation I found a letter from him, censuring me very much, and said that he had never paid a bill so reluctantly. He represented that I had extracted teeth by the wholesale for his child, and that he would never place her in my hands again. I simply wrote to him that I had done my conscientious duty, and asked him to make a careful examination of the young lady's mouth after two years and write and tell me whether he could discover that any teeth had been extracted. I have not heard from him, though that has been four or five years ago, and I know that there will be no spaces between either the upper or lower teeth. The twelfth year molar will come up to the bicuspid, showing a case like Dr. Chupein exhibited of the approximation of all the teeth.

Dr. A. W. Deane.—In 1879 or 1880 I heard you, Mr. President, with some of the others, advocate the retention of the sixth-year molar at the Pennsylvania Dental College. From that time on I have thought best to save all the teeth that God has put there, unless it be the wisdom tooth.

I have under my care about two hundred girls, and have had for six or seven years, of the St. Joseph's Home, at Seventh and Spruce Streets, and I would be very glad to have any dentist go there and use my name and examine any of the mouths, and see if they can find a mouth where they think the extraction of the sixth-year molar would be beneficial. I work just as hard, perhaps a great deal harder, to save a sixth-year molar than almost any other tooth, unless it be a lateral. A great deal of trouble is experienced with the first permanent molar, yet I cannot see where it is beneficial to extract the tooth; as these gentlemen who advocate its removal say that they cannot tell you when nor why to extract it, and Dr. Faught says there is just one time to remove it. What is that time? He cannot tell us. Dr. Chupein says extract it, but why? I do not see this shown in the case he passed around. We find many teeth that do not touch each other in the mouth anywhere at all, yet there are cavities in the proximal surfaces. Why is this?

In my own mouth the sixth-year molar was extracted when I was quite young. My mother took me to the dentist, and I had the tooth removed in the lower jaw, and the twelfth-year molar is tipped over, and if the man who extracted it were to receive all the maledictions I have passed on him, from food getting down and pressing the gum and causing the pain I have suffered, he would not need any Hades hereafter. The other sixth-year molar was extracted while I was in college, and that bothers me quite as much.

Dr. C. H. Littleton.—I think the extraction of the sixth-year molar very bad practice. Its strong support to the arch and its broad surface, so useful in masticating, are of sufficient importance to command our best skill in its preservation. I believe the advocates for the extraction of this tooth usually recommend it when the teeth are soft and much crowded in the arch. In such cases I have entirely satisfactory results by extracting the second bicuspid above and below.

My predecessor, Dr. Gates, had under his care three brothers who married three sisters. In these families there were twenty-eight children. All of their teeth were very soft, with a great tendency to crowd in the arch. When they came into my hands, Dr. Gates had extracted the second bicuspid above and below for eleven of them. Since that time I have had the same operation performed for eight more. In every case (except one which I have not seen) the spaces are entirely closed without the slightest irregularity of the teeth. Heavy approximal pressure is undoubtedly the cause of much decay in soft, chalky teeth. In such mouths, often, the approximal surfaces of the bicuspids are flattened, admitting of decay when it would not otherwise occur. The first molar will harden with age, and I have generally found it much easier to save than the second bicuspid.

Dr. W. G. A. Bonwill.—I rather compliment this gentleman on having the courage to come here and read a paper of that kind, but I am not with him; I compliment him, nevertheless, for his effort; but if I can raise my hand or voice to convert him, I would willingly spend an hour or the whole evening. It is very hard for a dentist to practise thirty years without having made some mistakes. Show me a man who has made no mistakes, and I will show you a man who has done nothing.

I do not agree with my friend. I do not see any way of settling this question or settling any of the difficulties that exist. We have no system of dentistry, although we have a number of volumes said

to be the American System of Dentistry, but who can practise by it? Can we give these as a safe guide to the beginners in the profession? Can we give them as a complete guide? Can we go to any one individual man in this assembly and get from him that which would suit us in practice on all occasions?

There is no system as yet, and I am very glad he has attempted to make one for saving the teeth. I have said of others, where they are using all amalgam or all plastics, if they can save teeth the way they do and cannot save them in any other way, God speed to them.

How are we to get clear of all these things? This gentleman comes here and tells us why he does it, and I believe he is a very honest man and speaks from his convictions, but still, at the same time, I would like to tell him just where he is doing wrong.

I have done a great deal of extracting for people who had not the money and time to have their teeth filled, and I have seen decay as the result of this extraction. I have had several cases in my office from other and older dentists, who very early in life extracted the sixth-year molar with most happy results, so far as the second molar coming forward and filling up the space.

When you come to take into consideration how nicely a crown can be put upon a root of the first molar, and serve the purposes of mastication for years, there is hardly any occasion for extracting.

I find it really the most important tooth in the mouth when the mechanical structure of the mouth is considered.

Of all the cases that have come to me from the hands of others where the first permanent molars have been extracted, I have yet to see, except in a few individual cases, where it would have stopped caries. Extraction will cause the rest of the teeth to fall back in the arch.

The first case I had was a gentleman whose teeth were so decayed it was impossible for me at that time to preserve them. All of his lower teeth were badly gone on the approximal surface at the age of twenty-one. I had to remove from first bicuspid the whole enamel. It was pitted as if it had had the small-pox. I left nothing but a cone standing upon its base. I cut off the entire distal surface of that tooth. For thirty-three years that gentleman has been coming to me, and he has never lost one of the lower teeth. The sixth-year molar is there, and he never had a tooth out until about three weeks ago. And all the upper teeth gone at the age of twenty-one. The first bicuspid, without a trace of enamel upon it, remained in that condition for thirty-three years. All at

once it commenced to show signs of decay above the edge of the cervical border; I filled it. The next year another place commenced at the very top of the cone. I filled that, and I have been watching it with the greatest solicitude and care ever since. So, when I look back and see the success of that one case, and how much could be cut from the surface and still save, why, sooner than extract a molar now, I would cut every particle of its enamel off and put a crown on. Besides, as I said a moment ago, crowning the teeth is such an important thing that for that reason alone I would not do it.

I want to propose one thing here to this Society. I think the best way of getting at this thing is to measure somebody else's half-bushel by our own. There are many who have cases of children, and they are generally willing to come before societies. If we could have a fair understanding with each other and with our patients, we could show these things. I am willing to bring my own children, and plenty of my patients would do it. I think I am right in this line of work. That is the best way to prove it.

Dr. Chupein brings this as a representative case [referring to model], but if my experience is worth anything, and if contour work is worth anything, then I beg to disagree with him; for if it is a representative case showing the possibility of saving teeth, it won't do it. The approximal surfaces of the bicuspid are safe, but the distal surface of the second bicuspid would go in spite of all efforts.

Dr. James Truman.—This discussion reminds me of one fact,—that all things move in circles, for I believe that these subjects come up regularly every one or two years.

I have been pleased to find that quite a number have defended Dr. Chupein, for I feared at one time that he was doomed to be in the minority of one or two; forty years ago he would have been in the majority. At that time nearly all the sixth-year molars were extracted. They were condemned with undue haste and without proper consideration.

I remember twenty years ago of having had a discussion on this very topic with my colleague and friend, Dr. Barker. The discussion grew very warm. He said to me, during the meeting, that he would bring two children with him the next day, and he would convince me that the extraction of the sixth-year molar was the proper thing to do. He brought his two children, and they were examined by others as well as myself. Beautiful sets of teeth they were, but in each of them the sixth-year molar had been removed, as he had stated. I then told him that if I lived to be old enough

to see these children when grown up, that they would exhibit spaces between all these teeth anterior to the sixth-year molar. He regarded the statement with incredulity. I have never seen them from that time to this, but a friend of mine who has operated for the family since the father's death assures me that the spaces are there.

What is the position of this sixth-year molar? It occupies a place in the series more important than any of the posterior teeth. It is the key of the entire arch. The direction of the anterior teeth is towards the median line. This inclination is essential to perfect articulation. The removal of any of the teeth changes this position to the direct vertical, and the disturbance will be in proportion to the size of the tooth. The removal of this first molar utterly destroys perfect articulation and makes spaces difficult or impossible to remedy.

Now, what is the sixth-year molar, that it should be condemned? It is not, of course, as dense at the age of six years as the twelfth-year molar is when it comes in; but it is demonstrable that every tooth increases in density as the years go by, and the tooth becomes more resistant to caries each added year.

I do not see how our friend Dr. Chupein can take, at this advanced period, the position he has to-night. It seems to me to be retrograding to that period I alluded to; but I think the profession has arrived at a time of increased intelligence in regard to the salvation of the teeth than would seem to be the case by the paper that has been read this evening. We are here to save teeth; that is our business, and we are not extractors of teeth, whether these be the sixth-year molars or others in the series. We must save them to the very last root, if possible.

Dr. Chupein.—It is not the object of my paper to recommend the extraction of all sixth-year molars, but only to take it in the condition that we find it and extract them when we think it is necessary. I have very frequently in my practice saved all the teeth that came to me.

I know of some families that have been sent to me, and, after giving the attention required, I have not seen them for a long time, and have wondered whether they were dissatisfied with my treatment and have gone elsewhere; but eventually some of these parties would return, and examination would show that other teeth had been extracted. I knew that I had not removed these, and I came to the conclusion that their teeth were in better condition with the teeth that had been extracted than if they had remained

with me and I had attempted to save them; so that I cannot be classified as an extractor of teeth.

So far as the spaces that are referred to by Dr. Kirk are concerned, I do not think that I have observed that the gums were ever inflamed by the spaces left between the teeth, such as represented on that side of the model. [Indicating.] I do not mean to say that teeth cannot be plugged and replugged again and again; but then I think we owe some consideration to the patients that come to us, and should try to save them as much pain as we can. I consider it good practice to extract this tooth at certain times.

Dr. Truman.—We all owe Dr. Chupein thanks for bringing this paper before us for discussion.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE American Academy of Dental Science held its regular monthly meeting, January 7, 1891, in the Boston Medical Library Association rooms, President Seabury in the chair.

The paper for the evening was read by Jacob L. Williams, M.D. Subject: "Plastic Materials in the Preparatory Treatment of Teeth."

(For Dr. Williams's paper, see p. 281.)

Dr. Chandler.—I would like to ask the essayist what is the advantage of oxide of zinc, finely pulverized, over feldspar? Why not mix that in place of the oxide of zinc?

Dr. Williams.—I found that the oxides, especially the oxide of tin, made a more intimate combination with gutta-percha than any of the simple pulverized minerals like spar. We did at first mix a little spar, thinking to make a stiffer mass, and thereby counteract the stringiness of the gutta-percha. I found, however, that the spar made the filling more friable. It was very much like trying to make putty with chalk. It can be done in a way, but an oxide will make a harder material than any simple substance like white feldspar, or even clay. Oxide of tin was found to be too dark in color, and often discolored the teeth, though I think it had a more antiseptic effect than oxide of zinc. I took precautions, however, to insure the aseptic condition of cavities without regard to the material used for stopping. Oxide of zinc combined nicely with gutta-percha, at the same time making a white filling and one which would not discolor the teeth.

Dr. Andrews.—I think it is twelve years ago that I read a paper before the Massachusetts Dental Society on preparatory filling. I have the paper at home, and wish I had brought it with me that I might speak of some of the points contained in it. My idea was to prepare young teeth for future permanent fillings by using adhesive plastic stoppings. And I stated that I found some advantage in using lacto-phosphate of lime under such fillings in order to induce the pulp to throw off calcifying material, and thus make the teeth more dense. I was pretty heavily sat down upon by Dr. Chandler and other members present. Dr. Chandler did not then believe that there was an advantage in preparing frail young teeth so as to bear permanent fillings.

I believe that under adhesive fillings the tubuli are partially recalcified.

Dr. Black and others will tell us that the tubuli are filled with fat. I believe that the material which they call fat consists of minute globules, to which have been given the name of caloglobulin, and these become calcified. I believe most heartily in preparatory fillings.

Dr. Chandler.—I remember the circumstance to which Dr. Andrews alludes. I did not then believe that lacto-phosphate of lime had any special virtue, and I do not believe it now. As I remember it, he made the statement that the lacto-phosphate of lime had some chemical or physiological action on the inside of the tooth which modified its condition and improved its quality. The ground that I took was that the simple filling of the tooth with gutta-percha stopped the fluids outside, arrested the ruin that was going on, and left the inside to take care of itself. It prevented all outside irritation and permitted the odontoblasts to go on with their natural work of depositing secondary dentine, but the filling had no chemical action, or any other influence with the tooth except the exclusion of destructive oral fluids.

Dr. Andrews.—I wish to correct the gentleman on one point. It was not gutta-percha which was used at that time, but oxychloride of zinc. The same results might, however, be obtained under gutta-percha if the same treatment were employed, provided the filling be absolutely tight. I will cite an instance showing the value of this preparatory filling. A student of mine had a pulp which was clearly bare, showing the pulsations of the vessels. An article which I had somewhere read stated that if lacto-phosphate of lime were placed over a pulp it would cause that organ to throw off calcifying material, thus forming a new covering. I had never

as yet tried this method, but I now used it upon my student. The application was made, and an oxychloride filling inserted and kept there for about two years. At the end of that time, the filling, being worn down, was taken out, and a complete covering of dentine was found over the pulp. A gold filling was then inserted by Dr. I. J. Wetherbee, using the hand-mallet. The filling was made at a clinic before the Massachusetts Dental Society about ten years ago. I believe the filling is still in position, and the pulp still alive.

Dr. Tucker.—Some ten or twelve years ago I was filling a cuspid tooth for one of my own family. It was a large cavity and the pulp was nearly bare, so that you could distinctly see the pulsation. I filled it with gutta-percha, Hill's stopping, and allowed it to remain there for twelve months. Of course I had a chance to see it whenever I pleased, and I know that there was never any trouble or inflammation about it. At the end of the twelve months I removed the filling, and at the bottom of the cavity there was a hard polished substance which was protecting the pulp. I then filled the tooth with gold, and it has remained perfectly well and healthy these twelve years.

President Seabury.—Did the pulp bleed any?

Dr. Tucker.—Not at all. It was apparently in good condition, but you could plainly see the pulsation before using the gutta-percha.

Dr. Williams.—Some years ago, when lactophosphate of lime was suggested as a nutritive help to pulps in forming secondary dentine, I tried it for a while in several cases. The impression which I got—I will not say that I established it as a scientific fact—was that it favored the formation of nodules in the pulp rather than the formation of an even layer over the most exposed point. Several cases of exposed pulps which I treated with lactophosphate of lime I afterwards found had pulp-stones in them, and for this reason I left off using it.

Dr. Briggs.—A great deal of credit is due to Dr. Williams for his efforts to establish the efficacy of preparatory fillings in the treatment of teeth. Dr. Andrews speaks of the criticism to which the method was subjected twelve years ago. I was in the way of hearing those criticisms, and I am now very much pleased to congratulate Dr. Williams on having lived to see his theory placed on a footing where it cannot be criticised, and to see the profession cordially endorsing it.

President Seabury.—As the next thing on the programme, Dr. Andrews will show his improved saliva-ejector.

Dr. Andrews.—I suppose that most of us have had the same trouble with the ordinary saliva-ejector that I have had. I refer to the disagreeable sucking noise and to the pain that is caused to the patient by having the mucous membrane sucked into the slits or openings in the mouth-piece, sometimes causing a painful bruise. I have devised an appliance which has relieved me of all this trouble. It is very simple, and I cheerfully give it to the members of the profession. A small tube, open at the upper end, is soldered to the main tube, and opens into the bulb at the end of the mouth-piece a little lower than the openings in which the saliva is taken into the pipe. It is impossible for the mucous membrane to be sucked into these, as the air coming down this small tube would immediately release it. The one that I show you is rather a clumsy one, but works very perfectly in the mouth. Any brass-worker can make them.

President Seabury.—Cannot you alleviate that trouble by shutting off the water and making the suction less?

Dr. Andrews.—No; I have tried running the water slowly, but if there is suction enough to take the water in at all, it will also suck in the mucous membrane.

President Seabury.—I have an ejector designed by old Dr. Fisk when he first invented the saliva-ejector. By slowing the water the sucking noise will stop, and yet there is force enough to remove the saliva.

Dr. Williams.—I want to mention a shape designed by Dr. Merrill, an associate of mine. It is rounded like a ball, but turning in with a slight cup around the tube which comes up in the centre. The holes, instead of being in the side of the tube, are in the top of the cup, and the tissues are not liable to be drawn into them. I like its working very much.

Dr. Eames.—At the last meeting I read a paper on "Sensitive Dentine," advocating the use of warm air as an obtundent. The appliance I then had for warming the air being open to many objections, I have since experimented with small metal tubing, and as a result this little contrivance is now presented for your inspection. I have been using it successfully, both with the compressed air-tank of Codman & Shurtleff and with the common foot-bellows.

The tubing is coiled closely in this shape, and is connected with the foot-bellows or air-tank, and placed on the rim of the bracket-lamp. To the delivery-end is connected a nozzle of glass, containing a thermometer which indicates the temperature of the air very near the point of exit.

This is essential, as the air cools very rapidly in travelling a short distance.

My main point was the advocacy of warm air at a certain definite temperature, and by means of this instrument one can judge very nearly what the temperature of the air is when it strikes the tooth.

There is no need of freezing a tooth or boiling it, when 115° F. effectually obtunds the sensitiveness of dentine. During the past three or four weeks I have been using warm air exclusive of other means or medication, and it has been successful in every case thus far.

At the present time I allow the temperature, as indicated by the thermometer in the glass tube, to range from 115° to 125° F., using my best judgment as to the temperature of the tooth-structure itself. This is modified, of course, by the nearness with which the point is held to the tooth.

I aim to have the temperature such that I can hold the nozzle in contact with the tooth.

Dr. Fillebrown.—There is already in use a gas-burner which automatically controls the flame and regulates it to any desired temperature. This might be used under a small tank of water in which a coil of pipe is immersed. The air passing through the coil would be heated to any desired temperature.

Dr. Eames.—The air will cool before it reaches the mouth.

Dr. Fillebrown.—You can have the coil as near the mouth as you wish, and if necessary allow for the cooling of the air.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy Dental Science.

HARVARD ODONTOLOGICAL SOCIETY.

THE Harvard Odontological Society held its usual monthly meeting Thursday evening, October 23, 1890, at Young's Hotel, Boston. The President, Dr. W. P. Cooke, in the chair.

Dr. E. C. Briggs read a paper on "Radical Operation for Removal of the Pulp."

(For Dr. Briggs's paper, see page 296.)

DISCUSSION UPON DR. E. C. BRIGGS'S PAPER.

Dr. Hamilton.—Mr. President and Gentlemen,—In looking over my record-book I find that I have performed since last June nine

operations of this nature. The first one was different from any that Dr. Briggs has mentioned; being a case where a large fungus growth nearly filled the cavity of a wisdom tooth. Little pain was caused by the insertion of the syringe-point, and the growth was completely paralyzed and removed; canals opened, cleaned, and filled. As I told the patient, it would be two years before I could fill the tooth permanently; the operation was a decided success.

Out of the nine cases, I have marked six that were complete successes. Of the successes, there were five fresh exposures, though there had been enough aching to show that it was useless to keep the pulps. One I had failed to devitalize with arsenious acid, and I managed to remove the nerve, but with a good deal of trouble and a good deal of pain. The exposure was distal on a lower molar, and the mouth was a very wet one. It was a pretty lively pulp, and the cocaine had very little effect on it. Another case had two old exposures, part of the pulp was sloughed and extremely sensitive. I managed to remove it, but complete success was not attained as in the other cases.

There is one thing to which I would call your attention,—if you cannot inject the cocaine thoroughly, you will not get relief from the pain.

In those cases where the destruction of the pulp was necessary, it was the custom before arsenic was discovered to put an instrument in and take out the nerve. Of course the pain was very intense, and the general idea to-day is that the removal of a pulp is accompanied by excruciating pain; the terror of that operation has lasted for forty years, ever since the use of arsenic. Now, here is the first improvement in destroying the pulp since the arsenious acid method was discovered,—the first real step to help us on in thirty or forty years, and I consider it the most important improvement since the rubber dam. We all know that arsenic is defective; nobody can tell what its effect is to be. We know it may ache, and probably will,—if it does not we are very grateful. The importance of this method is such that I trust all will try and see its advantage. Dr. Mason tried it the other day with complete success,—removing the pulp from an upper molar in which arsenic had failed; and I believe that the pain of putting in the hypodermic point, if it be done carefully, does not compare with the pain caused by the application of arsenious acid.

Dr. Charles Briggs.—I have had several cases, but I will describe but two. One was my own tooth, treated by Dr. Briggs, though not included in his paper. It was a lower molar, the pulp of which

had been exposed for several years ; it had not succumbed to arsenic, though it had been repeatedly exposed to its action. Dr. Briggs had capped it once, but I had the capping removed because the pulp got to be very rebellious. There seemed to be no way of destroying it except by the old method just mentioned, and I had concluded to allow it to take its course. My brother injected the cocaine, and the first pressure hurt considerably, but after waiting half a minute, or I think less, he took the engine instrument and went down into the pulp. I could not believe that he was doing so, as I felt absolutely nothing. He was called away and did not complete it at one operation. The next day he again proceeded, but the tooth was decidedly sensitive to the touch of an instrument. He treated same as before and removed the remainder of the pulp, filling the cavity without causing any pain. I have since experienced no discomfort from it whatever.

The second case was that of a hospital nurse who came to me with a wisdom tooth paining her. A dentist, in attempting to extract, had broken the tooth, leaving the pulp exposed and appearing above the surface of the root. She had suffered intensely for three days and nights, subsisting on a liquid diet, contact with solid food being agony. She could not endure any thermal changes. I took a piece of cotton saturated with a twenty-per-cent. solution of cocaine, touched it gently to the pulp, and waited a few seconds. I then took the hypodermic syringe, injected the cocaine, and removed the pulp in half an hour, the pain having all passed away.

Dr. Taft.—I should like to ask Dr. Briggs if applying the cocaine at one point of the pulp benumbs the whole, so that access can be had into any of the canals without causing the patient pain?

Dr. Briggs.—I apply it at the point of exposure, but once my tube is in, I force the cocaine down as hard as I can, so that I imagine it dissects its way all around the pulp. After the first pressure, which of course is a slight shock, I can then force it down steadily and hard, and discharge the contents of the syringe into the pulp-chamber. I then take a broach and remove the pulp.

Dr. Clapp.—Does Dr. Briggs prepare the cocaine fresh for every application?

Dr. Briggs.—I keep a small two-ounce bottle of the twenty-per-cent. solution at hand ready for use. I use it up rather freely, for, in taking up a whole syringeful that way, it doesn't take long to empty the vial.

Dr. Clapp.—Do you use an aqueous solution?

Dr. Briggs.—Yes.

Dr. Potter.—I would like to know one or two points in regard to this operation. In the first place, What shape of hypodermic point does Dr. Briggs use? The ordinary point is bevelled off decidedly, so that when you come to put in the point you do not insert the tube at all. It is a sort of entering wedge for the tube, so that this point would have to be buried in the pulp up to the entrance of the tube before any injection could be made.

The second question is, How does he guard against this surplus of cocaine being taken into the mouth? We all know that cocaine is a very powerful drug and needs to be carefully guarded against. I believe the medicinal dose is one-eighth to one-half a grain. In this operation evidently the cocaine is used quite freely. If the rubber dam were applied in each case, one could easily take care of the surplus, but in those cases where it is not used I should say it would be quite difficult to regulate that matter.

Dr. Briggs.—Those points are very good ones, and particularly the first one. I intended to have brought my hypodermic syringe with me,—or rather Dr. Hamilton's, for mine is used up. Unless you are very careful about them, they spoil; they must be washed out immediately. I spoke of using a hypodermic syringe, but that is not exactly what I do use; I file off that point, make it blunt, and some of the times that I have used it I have had fine gold tubes fastened into the end of the syringe. I intend to have a number of syringes made with the blunt end for this special purpose, both straight and curved, so that I can reach an exposure in any part of the mouth. That answers the first point. With regard to the second, concerning the surplus cocaine about the edges, of course, if the rubber dam is on, that answers the question; but where I cannot conveniently apply the rubber dam I wrap up very freely with thick, heavy doilies, which readily absorb the surplus. If it doesn't go down the throat, it doesn't matter much how strong it is, as it has no injurious effect in the mouth.

Dr. Clapp.—Have you ever observed any toxic effect from its use?

Dr. Briggs.—None at all. I have never heard of any toxic effect from cocaine except from those cases of injection into the mucous tissue. I do not think there has ever been a case from simple external application. I do not apprehend any trouble from its use by this method unless it is swallowed, and I am very careful about that, and have the patient wash out the mouth thoroughly before I begin to operate.

Dr. Taft.—Do you begin to operate immediately?

Dr. Briggs.—Immediately, because the effect passes off in a short time.

Dr. Potter.—I think this matter of guarding against the drug being swallowed is a very important one, and in connection with this operation attention ought to be called to it. It is very easy for a patient to swallow anything that is in the mouth while undergoing an operation. Cocaine is a very powerful drug, and if the rubber dam is not on it seems to me that with such a strong solution as twenty per cent., if the patient should swallow once, it might produce decided constitutional effects.

Dr. Giblin.—I would like to say a word in approval of the use of this drug. I suppose I average at least one pulpless tooth a day, and I have tried this drug in at least fifty cases since last spring. I have never used it with the hypodermic syringe, but I have been very happy with it in the form of crystals. I apply a few crystals of the drug in the cavity, which deliquesce in the pulp-chamber; when I find the pulp insensible, I remove it. I should think the use of the hypodermic syringe would be a decided improvement upon this method. There have been several cases in my vicinity showing toxic effects from the use of the drug injected in the mucous tissues or the subtissues. I have never used it in that way, but in the destruction of pulps I have had very favorable results from it.

Dr. Taft.—I should like to ask Dr. Briggs if he can tell us if the injection of chloroform or the bromide of ethyl into the pulp would not have the same effect, so that its removal could be accomplished without pain?

Dr. Briggs.—I cannot answer that question positively, as I have never tried either of them. I should not think they would. I have never succeeded in destroying the pulp by the use of cocaine crystals, as Dr. Giblin has, but it seems that in his hands it has been more successful. I have tried cocaine in various ways, but never until I used it in this form have I succeeded.

Dr. Taft.—I asked the question because Dr. Clifford has had very good results from the bromide of ethyl as a dentine obtundent, and, judging from its effect, it occurred to me it might be used with equally good results in removing a live and sensitive pulp.

Dr. Clifford.—I don't think it would succeed. The bromide of ethyl evaporates very quickly, and its obtunding action is from its rapid evaporation.

Dr. Briggs.—Those drugs have action, as a rule, as Dr. Clifford

points out, rather from the freezing effect which is the result of their rapid evaporation. It does not last long, and is more of a freezing operation on the surface of dentine to which it is applied, but whether it would extend far enough to reach up into the roots, I doubt. Cocaine has no action whatever when used on the fibrils, but when applied in this way has a more penetrating and lasting influence than the other drugs.

Dr. Taft.—What is the effect of the bromide of ethyl on the nerves when producing anæsthesia? Is it to be understood there is a freezing of the nerves in such case?

Dr. Briggs.—It doesn't go into the tissue and touch each nerve separately; it is not so understood. It is not because the drug goes into the system and reaches every nerve and benumbs it, but it has its effect, as chloroform does, upon the nervous system generally.

Dr. Werner.—I attribute Dr. Briggs's success largely to the force he uses to inject the pulp-chamber. The force of the jet displaces the fluids there, exposing the clean surface of the pulp for the action of the cocaine. There seems to be some analogy between the effect of the impact of the syringe and the force used in driving the wooden peg into the pulp-chamber. I am acquainted with a man who practises this method of driving the wooden peg with apparently considerable satisfaction to himself, and evidently with the approval of his patients.

Dr. Shepard.—Dr. Briggs spoke of hemorrhage occurring during the operation; does he do anything to control it?

Dr. Briggs.—I have never made any application to control it; it stops in a few minutes; only it is remarkable that it should bleed so much after the application of the cocaine, especially in the case of a fresh exposure.

In regard to the points brought up by Dr. Werner, I am quite sure that the method does not have the terror which must certainly accompany the operation of driving a stick of wood into the pulp, and the pain really seems to be very slight. In the cases in which this method has been used the patients have all expressed themselves as being well satisfied, and I do not think that the first impact is any more than what would result if one had applied arsenic, and found it did not act, and must try it over again.

Dr. Smith.—I would like to know Dr. Briggs's explanation of the hemorrhage that takes place. If, after the injection, the cocaine anæsthetizes the pulp, why does it not control the hemorrhage as it does when used in operation for cataract?

While I am on my feet I wish to simply acknowledge my indebtedness for the great pleasure and instruction which I have derived from listening to this paper. While perhaps the use of cocaine in the different dental operations is not original, certainly the application of it as presented by Dr. Briggs is, and it seems to me important. Dr. Hamilton says that it is not in the discovery and multiplication of mechanical expedients that the surgeon of this day declares his superiority so much as in the skilful and judicious employment of those which are already invented; so the essayist seems to be the first to employ the application of cocaine to the pulp instead of arsenic, and it to me seems a very valuable addition to our knowledge of dentistry.

It has been stated by one gentleman that this operation was analogous to the driving of a stick of wood into the pulp. The essayist has not only conceived this idea, but he has put it in practice, and he has given us the evidence of the success of the method in a variety of conditions. In one case he put the point of the syringe into the pulp and told the patient to press the plunger into the syringe, which the patient did without causing himself pain. Now, if the gentleman thinks it is analogous to driving a stick of wood into the pulp, I would like to hear the result if some day he should apply the sharpened end of a piece of wood to an exposed pulp, and give the patient a mallet and ask him to drive the peg in.

Another gentleman has wisely spoken of the necessity for caution. Like all operations of dentistry where the use of dangerous drugs is necessary, it requires the skilled hand and good judgment. From the number of cases presented, and from the uniform success of the method, I think we have reason, as hearers of this essay, to put it in practice ourselves. I look upon it as valuable, and I feel personally indebted to the essayist for the instruction contained in his paper.

Dr. Briggs.—I cannot answer Dr. Smith's question. It possibly can be reasoned out by a little study. One's first idea would be that the pulp would be less liable to bleed than after almost any other operation, on account of the known fact that cocaine applied in other places restricts the hemorrhage. I have given the matter some thought, but I cannot explain it now. I have not been able to see into the reason why it should bleed so freely, but that it does I state as a clinical fact.

Dr. Smith.—My theory for its not controlling the hemorrhage is this: the capillary circulation in the pulp is entirely different from the capillary circulation in other membranes. Experience

teaches us that the pulp is very slow to take up any medicament, and therefore really does not take up the cocaine into itself. The anæsthetic effect is produced on the surface, while in the mucous membranes the cocaine is taken into the capillary circulation and in that way tends to control the hemorrhage.

Dr. Giblin.—I have a theory concerning that also,—it may be wrong. In the use of arsenic it is advanced that it produces a suffocating effect at the apex of the canal, and in that way closes up the arterial circulation in the pulp. In the use of cocaine I believe that the pulp blood-vessels when cut in removing the pulp adhere to the walls of the cavity, and do not contract as a severed, torn artery in other places, and therefore bleed much longer. In extracting teeth we sometimes meet with a case where a tooth comes out very freely from the socket and is followed by arterial bleeding; and I have found that by inserting a long probe and tearing the connections of the artery, the hemorrhage would quickly subside, where in many cases styptics would not control.

Dr. Clifford.—Will Dr. Briggs tell us in what way it affects the hypodermic syringe?

Dr. Briggs.—The ordinary hypodermic syringe has a steel point which is simply coated over with gilding, and it rusts so rapidly I have great difficulty in getting it cleaned afterwards if it is left for a very short time without attention.

Dr. Clifford.—What would be the remedy?

Dr. Briggs.—Well, a gold point, but even then you would have to be very careful. It affects the whole syringe, injures the piston and the inner casing of the chamber.

Dr. Clifford.—It seems to act upon the syringe in about the same way as morphine?

Dr. Briggs.—Yes, only more so.

Dr. Hamilton.—In the upper jaw I prevent the escape of cocaine into the mouth; indeed, I fill most upper teeth by using a sheet of rubber dam as we commonly do a napkin, and then a napkin over it, thus preventing the latter getting damp. In cases where I had a large cavity, I would put over the points of my syringe one of the rubber cone that comes with Dunn's syringe, and by adjusting that carefully, putting the base of the cone towards the exposure, you can fit it so that the cocaine will not escape at all. By this method perhaps two or three drops will be all that you can force in, but I have succeeded in that way in two or three cases, and had no escape of cocaine into the mouth.

With regard to the action of bromide of ethyl or ether on the

pulp, you can freeze to such an extent that there is no feeling. I have seen the record of it having been used in that way, but I think the operator in every case destroyed the nerves of more teeth than he meant to. The action cannot be confined to the diseased tooth, but the tendency is to freeze adjoining ones.

Dr. Clifford.—Did Dr. Hamilton inject the chloroform into the pulp, or did he spray it?

Dr. Hamilton.—It was used as a spray. I do not know that injection has ever been tried. I have not used it myself, I simply spoke of having seen the record of it.

Dr. Clapp, under specimens presented, showed a Pasteur filter from which all the water delivered passes through porcelain, and is claimed by Pasteur to be absolutely sterilized, bacteria being entirely eliminated. Its capacity at the pressure found in the basement of "Back Bay" houses is, for a single tube filter, about five gallons in twenty-four hours.

The filter is easily cleaned, and, so far as a few weeks' use can demonstrate, is entirely satisfactory, the water filtered is clear, and after standing for a month shows no deposit. [Professor Sedgwick, of the Massachusetts Institute of Technology, in his tests of this filter, found it to be as claimed above by Pasteur.—ED.]

H. L. UPHAM, D.M.D.,

Editor Harvard Odontological Society.

Editorial.

CONTOUR FILLINGS: THEIR PLACE IN DENTAL HISTORY.

THE extraordinary efforts recently made in several directions to manipulate history, and have it appear that the dental profession has been indebted to two men for this form of filling, seems to require a more extended notice than has been accorded it.

The controversy has in some quarters assumed an unwarranted acrimonious character, and this personal feeling has in a measure obscured the facts. The development of the operation of stopping teeth, as all readers are aware, has not been the work of any one man. It has been a gradual evolution from the simple crowding of gold into a given cavity to the adoption of perfected mechanical adjustments for the accomplishment of the same end.

The earlier period, which may be termed, to use Dr. George S. Allan's expressive phrase, the "face filling" epoch, continued up to about 1847. As far as the writer is aware, from reference and personal observation, very few attempts were made prior to this to extend the proximal fillings beyond the walls of the cavities.

About this period the active minds of Westcott, Townsend, Arthur, Dwinelle, Rich, and others were busy with efforts to produce a filling that should assume more nearly the original form of the tooth. The effort to build gold, piece by piece, lamina by lamina, was then in process of development; but the prevailing idea that all gold must be absolutely "soft" was a bar to progress in that direction.

The controversy that held the interest of the profession for a long time as to who deserved the credit for the introduction of cohesive gold was eventually very properly decided in favor of Dr. Arthur; but, in addition, it was also demonstrated that others had been making use of this form of foil some years anterior to its introduction by him.

It was well known to students of Dr. Elisha Townsend that he

had a plan of "warming his gold" before filling; but the value of this was not then appreciated by those who admired his work. It is in the memory of the writer that Dr. Townsend frequently exhibited gold built up on coin as an evidence of what could be accomplished in restoring form.

That Dr. Westcott made use of the cohesive form of gold long anterior to its general adoption is quite certain; but whether he understood its real value in connection with stoppings may be questioned. The writer never had the pleasure of examining any of his work, but during a residence in Western New York, in 1847, he became familiar with the operations of one of Dr. Westcott's pupils. While at that time incapable of criticising, the fact remained that teeth were contoured with gold built out to the original form in a way not possible for ordinary methods at that period. Years subsequently, many of these very perfect fillings came again under observation, and they fully confirmed the earlier judgment. These fillings were inserted by the *aid of the mallet*.

That contour filling had its rise about this period there can be no question. It was a natural development growing out of changed conditions both in the material used and in the feeling that something better should be secured. This view is maintained by Dr. Jack ("System of Dentistry," vol. ii.), wherein he says, "The date when and by whom attention was first called to the prophylactic value of the truly contoured filling has not been clearly determined; the mode of practice appears to have been a gradual development which had grown out of the failure of the interstitial self-cleansing theories." It is impossible, however, to agree with the next paragraph, where he gives Dr. Varney the "credit not only for the most artistically produced expression in gold of the natural forms of the teeth, but of having a clear conception of their prophylactic value."

The formal introduction of cohesive gold in 1855 by Arthur led at once to the forming of gold surfaces more in accordance with the original shape. Contour fillings were common, indeed may be said to have been adopted among the better class of operators as early as 1858. Lost parts were replaced by gold built up to original and natural lines; incisors broken were reformed; entire teeth were built out with gold; molars were brought to the original masticating surfaces; in fact, all the work of the present was done thirty years ago as skilfully as it is performed to-day.

The place in dental history, then, of the work of Varney and Webb, so often quoted, is not as originators of contour filling or

even of new processes, but as holding exalted positions as mechanicians, worthy always of our remembrance and regard.

The time has arrived when dentistry should take a broader view than to suppose that the man who has succeeded in placing one piece of gold upon another is the ideal dentist. Dentistry means more than this. It means a liberal culture, a quite thorough knowledge of pathological conditions. It means the philosophy of treatment, and, consequently, it means, further, a capacity for diagnosis and prognosis. It comprises more of therapeutics to-day than at any former period, and he who is unfamiliar with all collateral subjects that enter into the training of an educated dentist, with a clear conception of the possibilities before him, has no right to regard himself a worthy follower of an honorable profession.

WILLIAM H. ATKINSON, M.D., D.D.S.

THE profession throughout the country will feel, in a positive degree, a sense of loneliness that this remarkable man has passed from his continued life of activity to be known no more among his fellows. So prominent and so pronounced has that life been, so intensely active for the good of the profession he early adopted and loved, that it is difficult to realize that the dental science of the future will never more feel his invigorating spirit.

His forceful character has left an impress on dentistry such as is given to few men to accomplish in a generation. His peculiarities were many and oftentimes obtrusive in their character, but these will be forgotten, and when the silent roll of names is called of those who laid the foundation and helped rear the superstructure of dentistry, his will not be the least.

How almost pathetic are the closing remarks of his on the subject of "Work," made before the Odontological Society of New York, February 17!—"Personally speaking, I feel that I do not know the lapse of time, or anything as to the consequences that in my best mood invoked my most enthusiastic efforts in doing the work. But that is progress. *It is made for me.*"

His later days were days of sorrow, and if progress be for him, and for all men, we hope that the shadow that fell on his declining years may prove but the dark background to the brilliancy which is yet to be.

BIBLIOGRAPHY.

HEREDITY. HEALTH AND PERSONAL BEAUTY. By JOHN V. SHOEMAKER, A.M., M.D. F. A. Davis, Publisher. Philadelphia, 1890.

It is somewhat singular that there is a growing tendency on the part of professional men to step outside the legitimate pathway to which they have been trained to walk and seek recreation, it may be in by-ways, not wholly their own, and oftentimes entirely foreign to what might be supposed their ordinary thoughts.

This work by Dr. Shoemaker, while in many directions in harmony with medical studies, in others it is quite evident that the author has trespassed on unfamiliar ground, yet notwithstanding this, there is throughout manifested a desire to rouse the non-scientific to higher conceptions of duty.

He deals with many subjects in the four hundred and twenty-two pages of this unique book, too many to even quote the titles.

We are tempted to transfer many passages, but space will not permit, nor would an extended notice be in accordance with the objects of this journal, but room must be found for this exquisite description of a farm-house recognizable by every one: "Who does not know the stuffy, darkened rooms of the ordinary farm-house, the subtle smell in the chamber of the painted window-shades, and of the long-plucked feathers in the pudding bed; the sitting-room with its single ray of light, sparing the colors of the carpet, by which one navigates towards a book; and the one room devoted to refreshments, where alone are light and air, and flies hold high revelry?"

The chapters on "The Regulative Law of Life and Growth" and "The Bath as Promotive of Health and Beauty" claim the special attention of the reader. The author is something of a traveller, and views the world with cosmopolitan eyes, enlivening his pages by scraps of information gathered here and there, adding materially to the freshness and interest of the work.

Probably the best that can be said of this book is that the writer began its examination by a general review, but found it so full of excellent thoughts that the interest was held in reading chapter by chapter to the end.

Obituary.

DANIEL FRANK WHITTEN, D.M.D.

RESOLUTIONS adopted by the Harvard Odontological Society at a regular monthly meeting, held at Young's Hotel, Boston, March 26, upon the death of Daniel Frank Whitten, D.M.D., of South Boston.

WHEREAS, It has pleased Almighty God to remove from among us our friend and associate, Daniel Frank Whitten, D.M.D. Therefore be it

Resolved, That in Dr. Whitten's death this Society has lost one of its oldest and most esteemed members and former presidents. Genial in disposition, eminently successful in his profession, Dr. Whitten was one whom we all loved as a man and honored as a dentist.

Resolved, That our heart-felt sympathy be extended to the family of the deceased in their bereavement.

Resolved, That a copy of these resolutions be spread upon the records of this Society; that a copy be sent to his family, and to the INTERNATIONAL DENTAL JOURNAL for publication.

WILLIAM H. ATKINSON, M.D., D.D.S.

WE are only able to announce in this issue of the JOURNAL that Dr. W. H. Atkinson died on April 2. He had had a severe attack of gripe which ended in pneumonia.

Dr. Atkinson was born January 23, 1815, and was, therefore, seventy-six years of age at the time of his death.

The work of his life has thus extended over a series of years the most important in dentistry, and in which all that goes to make it worthy to be called a profession has been accomplished.

We hope to be able to give in our next number a full account of his life-work.

DR. AMBLER TEES, SR.

THE sudden death of Dr. Tees in the midst of his active usefulness has created a deep impression. He has always been a worker. Few have devoted as much time and interest as he to the elevation

of his favorite calling in this, the city of his birth, and in the country at large.

He was born in Philadelphia, August 20, 1836, and died April 11, 1891, aged fifty-five years.

He graduated at the high-school in Philadelphia at the age of seventeen, and subsequently received the degree of master of arts.

He studied dentistry in New York with his brother-in-law, Dr. J. G. Ambler, and began the practice in 1856. He matriculated in the Philadelphia Dental College in 1864, and graduated with the first class of that college in 1866. While a resident of New York he studied medicine at the University of the State of New York.

Dr. Tees was an active society member, and became connected with the Odontographic Society of Philadelphia, the Odontological Society of Pennsylvania, and was also an active worker in the American Dental Convention during the closing years of its existence. His long and faithful work as secretary of the Odontological Society had much to do with the success of that organization.

The "Lilliput Furnace" for "Continuous Gum," which bears his name, gave him a national reputation. The "Tees Clamps" are still among the most valuable of these forms of instruments, and his subalveolar forceps have been appreciated by many.

His death was due to angina pectoris and heart complications.

Dr. Tees was a man of intense convictions. His positiveness of character oftentimes led him to be misunderstood, but those who knew him best appreciated his sterling integrity and moral worth. His skill in the preparation of continuous gum and in general prosthetic dentistry has been fully appreciated in Philadelphia, and led to special appointments in the University of Pennsylvania, Department of Dentistry, and in other schools.

The silent reaper is rapidly gathering the fruitage of many years. One after another of the earnest workers are being called away, and the duties they so ably performed must fall to other shoulders. May these be as well and worthily done as by the subject of this sketch.

Current News.

THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

The impending suit of the Tooth Crown Company in the Supreme Court of the United States will be reached this week; therefore this communication should be read at once by every dentist in the country.

THE purpose and plans of the Dental Protective Association of the United States have already been explained to you, and are, in brief, to defend its members, without expense to them when we have control of the case, in any suit brought against them under unjust claims of letters patent, owned by any corporation, party, or person.

The object of this circular is to show briefly why any dentist, not a member of this Association, must become so *on or before the 15th day of May next,—i.e., May 15, 1891,—*or be cut off from any opportunity of joining the Association, or from any protection by the Association, in case he is sued under certain letters patent, owned by the International Tooth Crown Company, covering dental work now commonly known as "Richmond Crown." Such letters patent are now in suit in the Supreme Court of the United States, under a record made, and suit tried by a committee of dentists headed by Dr. A. L. Northrop, of New York City. This case will be tried at Washington, D. C., in a few days.

The Dental Protective Association of the United States had nothing to do with the making up of this record, but has put in its patent counsels, Messrs. Offield, Towle, and Linthicum, of Chicago, Ill., to argue the case in behalf of the dentists, with the attorney for Dr. A. L. Northrop's committee, Mr. J. K. Beach, of New Haven, Conn.

The International Tooth Crown Company and its counsel speak confidently of winning this case, and if they do they will undoubtedly sue every dentist in the United States who is not a member of our Association.

We do not believe that any member of our Association will be sued by the Crown Company, even if it win this case. It has not for the last two years sued any member of the Association on any of the forty or fifty patents owned by it, out of the State of New York. This company has been forced by the Association to dismiss

every case it has ever brought against dentists in all parts of the United States, except the State of New York.

Our Association has sufficient proof and evidence in its possession to defeat the Richmond Crown patent in any suit brought against it, even if these patents are now sustained in the Supreme Court of the United States on the present record, but it is not justice to any of its present members that the Association receive or defend any dentist who remains outside until he is sued.

As has been already stated, the benefit of organization is that we can now step forward and defend any member, however humble or obscure, or however remote from the large centres, in any court, on short notice, with full and complete testimony to defeat these Tooth Crown patents, irrespective of and additional to any evidence presented in the case now pending in the United States Supreme Court.

The defence of one of these cases, which no one individual could afford, costs the Association many thousands of dollars and great additional expenditure of time, thought, and energy on the part of your committee; therefore, you can readily see the injustice of a dentist withholding or refusing to pay ten dollars *until he is sued*, and then expecting the Association to defend him.

We do not put our patent counsel in the argument of the case in the Supreme Court of the United States with the expectation of entire success upon the record now given, as it is in many respects unsatisfactory to us, but we do so in order to avert other dangers which we cannot explain here, and if possible to save the entire case. As before said in former circulars, these records cannot now be altered, but the accumulated evidence in our possession will enable us to bring much stronger testimony in a new suit.

1. Remember that the profession has already paid unjustly millions of dollars to the old Rubber Company.

2. Remember that the International Tooth Crown Company owns forty or fifty patents.

3. Remember that this is not the only patent company from which the Dental Protective Association has saved you.

4. Remember that the Crown Company will probably win the Crown suit as appealed. That a decision from the Supreme Court in favor of the Crown Company does not prevent the Protective Association from trying the same case over again on new evidence.

5. Remember we give you until May 15 to decide which side you will take, that of the dentists of America, or that of the Tooth Crown Company and other patent claimants.

6. Remember the membership fee is only ten dollars and no annual dues.

7. Remember to SIGN THE BY-LAWS AND SEND WITH YOUR CHECK or note, and thus save extra stamp and additional correspondence.

8. Remember we would rather have the money than the note, but when this is impossible, send the note payable when due.

9. Remember the funds accumulated are in charge of our treasurer, Lyman J. Gage, President of the First National Bank of Chicago.

10. Remember there are no salaries paid to officers.

11. Remember that united effort means success in its largest sense.

ARE YOU GOING TO HELP US?

All communications should be sent to the chairman, J. N. Crouse, 2231 Prairie Avenue, Chicago, Ill.

(This communication is sent to members as well as non-members. Members should use their utmost endeavors to secure new members.)

PENNSYLVANIA AND NEW JERSEY STATE DENTAL SOCIETIES JOINT UNION MEETING.—The Twenty-third Annual Meeting of the Pennsylvania State Dental Society and the Twenty-first Annual Meeting of the New Jersey State Dental Society will be held in joint session at Asbury Park, the famous New Jersey watering-place, on Thursday and Friday, July 16 and 17. The Papers will be by the most eminent men in the profession, who are already engaged. A great feature will be made of Clinics and Exhibits. Due notice of hotel and railroad rates, time-tables, etc., will be given in June.

CHARLES A. MEEKER, D.D.S.,

Secretary New Jersey State Dental Society.

H. NEWTON YOUNG, D.D.S.,

Corresponding Secretary, Pennsylvania State Dental Society.

UNIVERSITY OF MARYLAND, DEPARTMENT OF DENTAL SURGERY.—The Annual Commencement took place Wednesday, March 18, 1891. Number of graduates, 64; number of matriculates, 163.

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Original Communications.¹

STRUCTURE OF PROTOPLASM.²

BY CARL HEITZMANN.

MR. PRESIDENT AND GENTLEMEN OF THE ODONTOLOGICAL SOCIETY.
—In the year 1873 I made a discovery of the reticular structure of protoplasm. The discovery, as most of you are aware, consisted of the following facts: I saw in the amœba and other protoplasmic formations scattered granules, and the nucleus suspended in the centre, with powers not higher than about five hundred to six hundred, whereas if I looked at such lumps with powers higher than six hundred,—say eight hundred to one thousand,—I saw from the nucleus emanating conical spokes, which inosculated into the neighboring granules. I found all the granules were interconnected by means of delicate threads, and I observed that the most peripheral granules inosculated with an extremely thin layer enclosing the lump. The nucleus looks granular with low powers in a certain stage of développement. In the centre I saw a somewhat larger granule, which is termed nucleolus, and I recognized with higher amplifications fine conical spokes emanating from the nucleolus, inosculating with the coarser granules, and terminating in the

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the New York Odontological Society, March, 1891.

wall which encloses the nucleus itself. I said at that time that this reticular structure is by no means seen in all phases of development of protoplasm. I maintained that only in the full stage of development of protoplasm this reticulum is visible. My assertion has been that we see no isolated granules within the protoplasm; but that all the granules are interconnected into what I claimed to be a reticulum.

Necessarily the question arose, What is this reticulum? I have claimed in 1873 that it is the living or contractile matter or substance which produces the granules, the connecting threads, the thin layer ensheathing the lump, and the whole vesicle termed nucleus. I said so because I have seen this reticulum, in a living lump, continually in motion. I could explain by the presence of this reticulum every change in shape, so-called amœboid motion, and in locality, the locomotion. I said that the meshes contained a liquid, which as such could not be living matter, for we know that nothing endowed with properties of life is ever a liquid; but I simply took it to be a nitrogenous liquid being suspended in the meshes, causing the appearance of a honeycomb or sponge.

What I saw at that time, during the changes of place and shape was this: in one spot the protoplasmic lump showed the granules slightly enlarged, put together, as it were, the meshes consequently narrowed, the connecting threads shortened. This condition I called the contraction of the living matter, whereas, on the opposite end the reverse took place. The granules became smaller, the connecting threads finer, the meshes themselves enlarged, and as this went on, both granules and threads became more and more delicate, until at last they disappeared to the eye, even with the best possible lens at my disposal, very much like a rod of glass melted over a flame, being drawn into length, would disappear. This condition I called extension. I concluded that the liquid is driven out from the contracted part to the opposite side. I compared this reticulum with a sponge, whose meshes were saturated with water; but the sponge was enclosed by an extremely thin layer of material,—the same which builds up the trabeculæ of the sponge. For if there were no such layer, the liquid would escape.

I said if I could produce a sponge that would be enclosed with a layer perfectly elastic, extensible to the utmost degree, I could imitate the amœboid as well as the locomotion, by pressing on one end of the sponge, driving the water to the other, which could not escape on account of the enclosing layer.

Gentlemen, this observation was perhaps not made accidentally. My eyes at that time had been educated by many years of careful drawings of microscopical objects. It was certainly not an easy matter for anybody to see that reticulum. Still, I trusted my own eyes; I could demonstrate it to some good microscopists, and in 1873 I published this in a short article in the transactions of the Vienna Academy of Sciences.

At that time I was not aware of one fact, and that is, that five or six years before me, C. Frommann, of Jena, Prussia, had observed a reticulum in some connective-tissue corpuscles. He described a reticular appearance without any illustrations thereof; for what he drew was one single offshoot, emanating from the nucleus, which certainly would not make a reticulum. Still, I mentioned this fact in my book, published in 1883, and was much surprised when I learned afterwards that Frommann had complained of my being unjust towards him, not giving him fully what he deserved. An amicable correspondence ensued between us several years ago, for I was extremely desirous to do that man justice, and I publicly announced that Frommann, in fact, was the first man who saw the reticulum with the higher powers of the microscope. Instead of being thankful to me for this acknowledgment, he once more attacked me. He said that he saw that reticulum with a power not exceeding four hundred and fifty diameters. In the face of this statement, I am at a loss to find out what Frommann had seen at all, for I, with, I believe, expert eyes, was not able to see this structure with the power of four hundred and fifty. I say that not because I claim priority. Claims of priority, you all know, are rather childish. Who first discovered a truth is of entirely secondary consequence. If Frommann claims priority I am perfectly willing to accede it to him; but, nevertheless, I cannot help putting before the public the facts which Frommann himself printed, and, of course, there being no illustrations, only description, we cannot state exactly what Frommann did see, as early as 1867.

The discovery came before the scientific world, and although I was thoroughly convinced of the correctness of the observation, I did not expect contradictions as ardent, as zealous, as bitter as did, in fact, afterwards ensue. I will quote just a few words from different authors to show to you what their views were. Among the Germans it was Friedländer, of Berlin, who saw the reticulum, admitted its presence in the protoplasm, but at the same time claimed that it is caused by reagents, especially by the chromic acid solution, which I have always advocated for preservation of tissues.

Much later, Professor Butschli, of Heidelberg, described a reticular structure, and called it "Honeycombed Appearance of Protoplasma," which is exactly the same as that which I have described.

Among the English authors I wish to quote Alb. E. Schäfer, who, in the second volume of Quain's book on anatomy, gives me credit for the discovery. Further on, E. Klein, of London, my personal friend, who, in the last edition of his book, says that protoplasm is often of reticular structure, especially if treated with certain reagents.

Now, gentlemen, this is not an exact corroboration of what I have said; for, as you will presently see, this assertion is mistaken. I have seen the reticulum in the living protoplasma, and as such it is now photographed in this way.

Far more satisfactory is the description and the picture of Mr. Edward Clodd. He is the author of a scientific work, "The Story of Creation," published in New York, and on page 41 you will see wood-cuts called "Diagram of a cell, showing the honeycomb appearance and the reticulum," just in the same way in which I described it in 1873. Both in the nucleus and in the protoplasma we see the reticulum to perfection. Mr. Clodd does not quote anybody for the discovery, and perhaps he does not know who was the man who first saw it, but, as I said, I would not lay stress upon this. The fact nevertheless stands, that this gentleman knows the structure of a cell as well as I do.

Last year, while in Europe, I entered the laboratory of my dear old teacher, Professor S. Stricker, in Vienna, Austria. I was informed by him that he had been successful in producing, by means of photography, an image which would certainly surprise me. He handed me a volume, on the title-page of which you will find his dedication in German. The title of the volume is "Works from the Vienna Institution of General Pathology, 1890." Here you will see a photograph, not a micro-photograph, which means a small photograph, but a photo-micrograph,—*i.e.*, the photograph of some small object. It is a photo-micrograph of the colorless blood-corpuscle of the proteus that lives in the Adelsberg Cave in Carinthia, Austria. It is without eyes, is peculiar to this cave, and is noted for the large size of its blood-corpuscles. You know we have similar water-lizards or newts in this country, too. This animal served as a topic for the illustration of the colorless blood-corpuscle in question. The so-called electric microscope was used for instantaneous photography. The electric microscope is an apparatus by means of which we can project microscopical specimens with a

light not less than forty ampères strong. I am in possession of this apparatus, which I purchased several years ago; but I could not bring it to work, simply because there was no possibility of getting forty ampères light in this city. All the experiments that we have made with the Brush Electric Company, and some other companies, proved to be failures. I could not get a room to put up the electric microscope. I offered it to this great Academy of Medicine and was refused; it seems simply for fear of danger of fire. I said, if they refused it for that reason, I would be willing to pay the surplus of the policy of fire insurance out of my own pocket. Still they would not accept it. Why, is utterly unintelligible to me. Of course, we would have to purchase some more apparatus, a revolving dynamo-machine, which is used for the production of enormous light, and a motor apparatus, which would be an additional expense of eight hundred dollars. I was perfectly willing to incur this expense also if they would give me the room. Nay, I wanted to present it to the Academy, not for the sake of profit, but simply for demonstration. All without avail. Several years ago it looked as though some dentists would take it. It was needed for the demonstration of several delicate observations, and I know that Dr. Bödecker tried hard to bring it to work, but it proved to be an utter failure, simply on account of the lack of intensity of light. Thus the beautiful instrument, which was constructed by Stricker, is still standing in the extension of my house at rest.

The electric microscope enables us to bring forth a power which otherwise could not be reached. Stricker used the power of twenty-five hundred diameters, and, as a result, saw a colorless blood-corpuscle almost two inches in diameter. If you look close, gentlemen, you will see the reticulum that I described in 1873 plainly represented in the photo-micrograph; especially look at the right lower part, where it seems to be in the best focus. You will recognize the granules as glistening lumps, and from these the conical spokes emanating and inosculating into the neighboring granules, thus producing a net-work. At the same time you will see the thin enclosing layer of the protoplasmic lump perfectly plain.

Stricker does not say what the reticulum is. He simply wanted to publish the picture by transferring the photograph by means of heliogravure. It is made without interference of human eye, or human hand, and, you can see, the result is gratifying to the utmost degree. That this reticulum therefore exists, I do not think is any more a topic of discussion or doubt.

The greatest blow that has been made against my views, several

years after the publication, was the discovery of karyokinesis, or mitosis. It was Schleicher who did most of the work in the description of the peculiar changes which take place in the nucleus preceding its division. The nucleus, as I described it in 1873, was reticular. New observations were made; the substance of the nucleus appears in the shape of loops, which originally make a wreath, afterwards a star, later a double star, and, at last, lead to the splitting up of the nucleus into what was called its indirect division. Remak, many years ago, described a direct division of the cells, which means that an original cell would become thinner in the centre,—the same being the case with the nucleus,—and there a division would take place, and two individuals arise, by direct division. The karyokinesis led to an indirect division, since it commenced in the nucleus first, afterwards caused a narrowing of the protoplasma, and at last a splitting up into halves. It has been asserted that the formations, being the result of karyokinesis, were, as a rule, lying in a space in no connection with the rest of the protoplasm. I said before, it was the hardest blow on my theory, since I have claimed that the nucleus was nothing but a compact mass of living matter,—whereas the reticulum in the protoplasm was a delicate formation of that same matter. Now, it looked as if the nucleus had nothing to do with the protoplasma. Some authors claimed that it was built up of a material of its own, and they composed the word *chromatin*, which means a material easily colored by certain dyes, whereas a number of delicate threads visible in the nucleus were called *achromatin*. Others called the substance building up the nucleus, *nucleine*; the substance not colored, *para-nucleine*. Quite a number of words have been established, which, in my opinion, are altogether superfluous. That indirect division exists is out of the question. The question is, What is the substance building up the nucleus? If it were true that we see no connections whatever of the loops of the nucleus with the rest of the protoplasm, then my theory must fall to the ground; there is a perfectly legitimate proof that I was wrong in my assertion that the nucleus and the reticulum are made of the same material.

I have kept quiet about this until quite recently. What I knew was that, if you look into a living, moving protoplasmic lump, you will not see karyokinesis; neither will you see it when you preserve your specimens with chromic acid solutions. Certain peculiar materials are required for bringing forth the loops. The solution of the puzzle is, that somewhat more solid masses of living material will take up certain dyes more easily than delicate formations,

whereas others remain unstained, not because they did not take up the colors, but simply because they are too fine to be stained at all, very much in the same way that we have long since known of carmine.

I admitted that often we see a closed space around the karyokinetic figures, but by no means always. I have repeatedly observed connections of these loops by means of conical off-shoots with the reticulum of the surrounding protoplasm, especially in chromic acid specimens, although the karyokinetic figures were not plain. More than that, Schleicher, who was the first to use the word "karyokinesis," directly states that he saw the loops in movement. Now, pray, what substance can there be which is seen directly moving, which must move in order to produce such remarkable figures, and which is in direct connection with the reticulum? Was I right or not? Do we need new Greek words? If we say the nucleus is the same substance which builds up the reticulum of the protoplasm,—viz., living or contractile matter,—we have said everything we need to know. Karyokinesis means movement of the wreath. Mitosis means splitting up to threads. Some others use karyomitosis, but it makes no difference. What I wish to emphasize is that, unless there be present a certain amount of liquid in a vacuole or plasmatic space around the nucleus, the connection of the karyokinetic figures with the rest of the reticulum is visible. Being a member of the American Association of Anatomists, and having examined specimens of such connections, I took them along, last year, to Boston, where we had a meeting, and, with powers of about one thousand, demonstrated the connections with the rest of the protoplasm. At the same time I was disappointed in finding in the work of Klein a statement to the same effect,—viz., that in many instances we see the connections of the mitotic or karyokinetic figures with the reticulum of the protoplasm,—which fact goes far to prove that the substance building up the nucleus is in fact nothing but living or contractile matter.

In looking over the literature of the cells, we are astonished to find so many answers to an apparently simple question: What is the nucleus? Before the discovery of the structure of protoplasm the nucleus had never been considered as something essential. In the original diagram of a "cell" the nucleus played a certain rôle; that was in 1839: about fifty years ago. Some thirty years ago, Max Schultze said that there exists no cell-wall at all. In the same way E. Brücke, of Vienna, said the "nucleus is nothing essential, being of secondary importance." Twenty years ago nobody consid-

ered the nucleus as necessary to the idea of a cell; and Brücke in 1861, proposed to strike out the granules of the protoplasm too. In this way S. Stricker described protoplasm as a homogeneous, structureless mass, and you see Klein still uses the same wording for its definition. How much we have learned in the last twenty years you will see if you compare the figures of Mr. Clodd. He gives karyokinetic figures, and tries to show structure even in the threads. I cannot follow him in that, since we must admit that living matter is apparently structureless, even to the highest powers, and we cannot analyze it even with the best lenses at our disposal. All we can say is that protoplasm holds a certain amount of living matter, it is not structureless; but as to the structure of the living matter itself we know nothing.

Now, gentlemen, just a year ago, in this very Society, the question of the structure of protoplasm became mooted. You will remember that a resolution was passed that myself and some of my friends should be compelled to demonstrate what we maintained to experts, who would be chosen by this Society. The wording of the resolution was of a kind which plainly showed that it was written by a man who did not know what he was about. He did not know even the elementary nomenclature of our doctrines. Long since the word "protoplasmic" was adopted for the definition of a reticulum built up by protoplasm, and for naming what we call a myxomatous tissue. It is a reticulum made up of protoplasm, in which, of course, there would be visible a reticular structure and scattered nuclei. The reticulum which we call protoplasmic is of a myxomatous nature; but to call the reticulum, which is visible in the protoplasm itself, a protoplasmic reticulum is a great mistake. This mistake was the most formidable weapon against the man who made up the resolution, as you all remember, and Drs. Abbott and Bödecker and I discarded the whole question.

Such are the facts; and now permit me to review what we have done in the last sixteen or seventeen years for the demonstration of the new ideas, especially in the science of dentistry, in dental anatomy. Shortly after my arrival here I was happy enough to become acquainted with a number of excellent men of your profession, who, more by intuition than by conviction, thought that here was something worth looking up. It was, in fact, a remarkable thing that, owing to the kindness, I suppose, mainly of Dr. Wm. H. Atkinson, hundreds of dentists flocked to my laboratory, studying not only dental but also general histology. I could demonstrate to every one of them the presence of the reticulum in the

protoplasm, and I suppose every one left the laboratory satisfied that he saw the reticulum. Unfortunately, however, it is not everybody's business to continue such studies. Some told me that after they had left the laboratory, they tried to see the reticulum again, and failed. On the other hand, there was continuous opposition against my assertions, which, as you know, involved entirely novel views concerning the structure of the tissues; and the consequence was that the zeal of the dentists to study dental histology abated in the last six or seven years. Unquestionably every one who is a revolutionist as I am has to stand opposition. Have we ever seen a new idea, contrary to the ruling views, adopted at once? No. Think of old Harvey, who was declared to be an absolute crank for making the assertion that blood flows through the arteries! The old doctrine was that the arteries contained air, and if Harvey announced the idea of a circulation of blood, he was, of course, a crank. Bitter articles were written against him, and it took quite a while, until at last the idea dawned on the minds of some that Harvey, in fact, was right.

I do not claim to be a Harvey. Far from it. But I claim having offered a theory which is far more plausible than the hitherto acknowledged cell-theory. Quite recently I was a witness in a law-suit, where I was cross-examined by Mr. Choate, and this gentleman, among other things, urged me to give an outline of the new views. I saw at once that he tried to make all that ridiculous, as lawyers do; but I quietly told him the following: "Before the Berlin Museum there is put up a grand marble vase, as high almost as this room, colossal in dimensions, but made without taste,—ugly, in fact. I asked my friends there, 'Why could you Berlin people put up such a tasteless concern as this?' The answer was, 'My dear sir, that is one piece of Prussian marble.' 'Oh,' said I, 'here is the new view of the construction of the body.' Imagine that this marble vase was made up of millions, or, as Dr. Sudduth said once, innumerable numbers' of small pieces of mosaic, pasted together by cement, and you would have the old idea of the cell doctrine,—viz., that our body is made up of millions and millions of cells, pasted together by a little intervening cement substance. But if, on the contrary, you say this marble vase is one continuous mass, and although exhibiting different shadings and varieties in structure, nevertheless is one piece, then you have my idea that our organism is one piece,—and there are no isolated cells whatever within the tissues."

Mr. Choate seemed to be well pleased with this comparison, and

I repeat it to you because I think it is a very plain one. What I claim is not absurd; on the contrary, I think it is rather sensible to say that we are one individual, and not made up of millions of individuals. To be sure, in that mass that we call our bodies we have closed spaces or vacuoles in which are circulating detached lumps, very much like in the *amœba* there are closed spaces or vacuoles in which float detached particles of living matter. In our blood there are floating isolated lumps called red and colorless blood-corpuscles, but they are not a part of our structure. That is not a tissue, for it is liquid.

At the last meeting of the American Society of Anatomists, Professor Gage, of Ithaca, gave us a nice demonstration of the fibrin of the blood, and said the blood is a tissue. I took exception to this view. I said, "There exists no proof that a liquid ever can be a tissue. A liquid cannot be alive. Even the jelly-fish, such as we get in autumn by the handfuls on Coney Island or in the East River, are jelly-like bodies, but not liquids. If the theory that blood is a tissue be correct, then a pailful of sea-water in which there are a hundred fish swimming about is a tissue too, and a droplet of puddle water, in which there are swarming thousands of minute organisms, is likewise a tissue." Professor Gage opposed me, of course. I still maintain that a liquid cannot be alive and cannot be a tissue.

The body, so far as its tissues are concerned, is one continuous mass. There are no isolated cells. There is a continuity of protoplasm all through, and it is the reticulum of living matter that we have traced in all tissues constituting the body, including those building up and forming the teeth. For this is the new view by means of which we can realize that even the enamel and dentine, which are rather hard tissues, must be endowed with properties of life. We see the reaction in the dentine after each filling, and this fact proves that there must be some life. Where is life located? Is it in the lime? Is it in the dentinal fibres? Yes, but is that enough to explain the reaction after each filling, which will cause a hard wall around the filling?

There is something more. It is just the reticulum, the presence of which has been demonstrated in the protoplasm of the pulp, and throughout all hard tissues of the teeth. Its existence was proved in the enamel by Abbott, and quite recently in the dentine by Dr. John I. Hart. William Carr took up this study in my laboratory four years ago, but never could finish it. The conclusive proofs were furnished only in the last few months.

Gentlemen, you will ask me, can I boast of followers in this world, or am I alone in my little school? Ten years ago, Professor S. Stricker, although originally my teacher, adopted my views, and publicly claimed that I was right in my assertion that basis-substance is alive, the same as are the so-called "cells." Virchow, in Berlin, will never admit it. He is the founder of the cellular pathology, and as soon as he admits that there are no cells, his life's work is gone. What he has done remains forever. We will not attack him should he be mistaken. We know too well that our successors will step over our shoulders, and woe to us if they do not treat us and our memory well!

We have all reason to be kind, even with those who are mistaken, providing they do honest work. You may ask, Have I followers in this country, outside of those who have studied in my laboratory? I say yes. Last year a prominent citizen of this city, Mr. Charles F. Cox, delivered a presidential address before the Microscopical Society, which is printed, and which was sent to me by him. I do not know him personally at all.

Permit me to read what he says about me and my views:

"I can well remember, as perhaps you also can, the disgusted incredulity with which this new doctrine was received,—an incredulity in which, I confess, I then shared. I am not sure that the appearance of a reticulum in the prepared blood-corpuscle is even yet generally accepted as evidence of a normal structure of the kind claimed by Dr. Heitzmann; but the claim certainly gains support from the fact that vegetable histologists are pretty well agreed that a more or less similar reticulum is demonstrable in the protoplasm of plants. Professor Goodale seems to have no doubt on this point. . . .

"In the work from which I have just quoted ('Microscopical Morphology,' New York, 1883), Dr. Heitzmann generalizes as follows: 'What . . . was called a structureless, elementary organism, a "cell," I have demonstrated to consist only in part of living matter, while even the minutest granules of this matter are endowed with manifestations of life. The cell of the authors, therefore, is not an elementary, but a rather complicated organism, of which small detached portions will exhibit amœboid motions. . . . How complicated the structure of a minute particle of living matter may be we can hardly imagine; what we do know is that the so-called "cell" is composed of innumerable particles of living matter every one of which is endowed with properties formerly attributed to the cell-organism.'

"It having been shown that life hangs upon a web of infinite tenuity, and does not reside necessarily in either a vesicle or a lump, it was a natural and easy step to extend this net-work from tissue to tissue and organ to organ in an unbroken circuit of vital communication. This step Dr. Heitzmann does not hesitate to take; for, says he, 'there is no such thing as an isolated, individual cell in the tissues, as all cells prove to be joined throughout the organism, thus rendering the body *in toto* an individual. What was formerly thought to be a cell is, in the present view, a node of a reticulum traversing the tissue. . . . The living matter of the tissues exists mainly in the reticular stage, and is interconnected without interruption throughout the body.'

"Again, this at first very strange and, for some reason or other, unwelcome doctrine receives support from the investigations of botanists; for, as Professor Goodale remarks, this protoplasmic intercommunication between adjoining cells 'has been shown to be so widely true in the case of the plants hitherto investigated that the generalization has been ventured on that all the protoplasm throughout the plant is continuous.' The position to which we have traced this matter is, then, that to the latest biology, in any particular organism, a generally diffused and interconnected substance, simple only in appearance under present optical aids, has taken place of the circumscribed, more or less isolated and independent, and recognizably complex vesicle which was the physical basis of life to the science of fifty years ago. In the words of Dr. Heitzmann, 'According to the former view, the body is composed of colonies of amœbæ; according to the latter, the body is composed of one complex amœba.'"

Gentlemen, truth is welcome from whatever quarter it may come. I have had in these last years many dentists in my laboratory, and, of course, I could not help having also opponents, and some of them bitter ones, who in spite of my polite invitations to come and see refused to do so. All I have to do is to heartily thank all who have come to my laboratory, and especially thank those who have done original work there, although their number as yet is rather limited. I have to thank especially Dr. Bödecker, Dr. Abbott, our old friend Dr. Atkinson, and of late Dr. Hart.

Gentlemen, in this country, where practical dentistry is so far ahead, why should we not have more original work in the line of a microscopy? Why should we adhere to the views of those dull fellows over the sea, who do not even do justice to us, as I have shown before the First District Dental Society, and perhaps cannot

even realize what we are about? Why should we still depend upon them? We have the means to do original work. Why is it that so few enter it? That we are on the right track I have endeavored to prove to you, and if I have succeeded, I shall feel gratified.

THE PHYSIOLOGY AND PATHOLOGY OF THE SECOND DENTITION.¹

BY RICHARD COLE NEWTON, M.D., MONTCLAIR, N. J.

A YEAR ago I had the honor of addressing this learned Society on the subject of "The Teeth as a Factor in Diagnosis." Naturally, as a clinician, I looked at my subject from a practising physician's stand-point. The discussion, however, which my paper excited showed that the dental profession is fully alive to the economic importance of the teeth, and has noted and studied the peculiarities in these organs which are caused by different cachexiæ and various morbid states of the system, whether hereditary or acquired. Having been doubly honored by a second invitation to read a short essay before you this year, it has occurred to me that one might with profit take up another phase of our subject of last year and consider the physiology and pathology of the second dentition somewhat in detail. When we reflect that the infant comes into the world with the rudiments of four permanent teeth, we may fairly say that the physiology of the second dentition begins in intra-uterine life and terminates with the eruption of the wisdom teeth, say at twenty years of age; we have then to do with the most important third of human life, at least from a physiological point of view, and a thorough discussion of our subject would take us over a great extent of ground, much of which is already familiar to you. I will not, therefore, weary you with an elaborate discussion of the physiology of the first twenty years of life, but will endeavor to point out the relation that the process of the second dentition bears to the general health, and will supplement this with a few remarks on the hygiene of this period, which I trust will not be without interest.

Human life has roughly been divided into periods of seven years,

¹ Read before the New Jersey State Dental Society, at its annual meeting, 1890.

and it is estimated that the whole body will be practically transformed by the slow process of elimination and substitution in about that period of time. The period of life from birth until the completion of the second dentition naturally divides itself into three periods of about seven years,—viz., first, until the complete eruption of the first four molars of the permanent set; second, until the complete eruption of the second four molars of the permanent set; and third, until the complete eruption of the third four molars. Of course these periods are subject to considerable variation, especially the last; but they are constant enough for the purposes of discussion, and afford convenient divisions of our subject. The first period, *i.e.*, from birth to seven years of age, is, I am inclined to assert, without fear of contradiction, from a physiological stand-point, the most important period of human life, and I believe that it can be shown that the care of the child up to seven years of age has more to do with his subsequent development than any other factor, heredity, perhaps, excepted. During this period the crowns of all the permanent teeth, except the third molars, are formed. The brain experiences over two-thirds of its complete development. The child has mastered the use of his senses, has learned to reason, has learned an elaborate and difficult language, and has often learned to read, etc. In short, in no other seven years of our earthly existence is a corresponding advance made. Now, what marks the conclusion of this period? I reply, the complete eruption of the first molar teeth of the permanent set. Owing to the varying lengths of time that different children take to reach the same stage of development, the eruption of these teeth affords a far better and safer criterion of the completion of the first physiological period of life than the mere lapse of months or years. By the English factory laws a license to work full time is not given to the youth of either sex until the second four permanent molars are completely through. This has proved to be a more reliable test of physical capacity and endurance than age or stature, since often the tallest and largest children are really the most immature and frail. Nor is it unnatural that it should be so. *Ceteris paribus*, it must take longer to develop a large body than a small one, and the old-fashioned phrase, "out-grown the strength," like most popular notions, has a foundation in fact. Naturally the development of the first four molars has less interest from a commercial point of view, but it undoubtedly marks as important a stage in bodily development as does the eruption of the second molars.

We see, then, that the complete eruption and occlusion of the

first molar teeth mark a very important era in human life. The brain has attained very nearly its growth, although it increases slowly up to twenty or even thirty years of age. Its growth subsequent to seven years of age is much slower than previous to that time.

The body has also at seven years of age attained about two-thirds of its height and over one-third of its average weight, if its processes have gone on normally, and I think I have said enough to show that the complete eruption of well-formed first molars is the most important criterion and sign of a normal development of these great powers and a completion of the first great division of human life.

The second physiological period is, like the first, ended by the complete eruption of four molar teeth,—viz., the second permanent molars. During this period the rudiments of education are secured, the character is for the most part formed, etc. By fourteen years of age a pretty fair estimate can be obtained of the way in which the child will turn out physically and mentally. Are there any especial features that interest us as clinicians in the second dentition, especially from the seventh to the fourteenth year?

The late Dr. James Jackson, of Boston, in his well-known "Letters to a Young Physician," dwells at some length upon the diseases of the second dentition, as does also in another place our distinguished countryman, Dr. George B. Wood. As there are those who deride the considerable importance accorded to the first dentition from a clinical stand-point, no doubt there will be very many who will assert that there is little or nothing to be said in the matter of the clinical importance of the second dentition, but I think it can be easily proved that the latter class seriously under-estimate the significance of the second as well as of the first dentition.

Mr. Jonathan Hutchinson says that the first four molar teeth are the test-teeth of a condition in children which leads to the formation of cataract, and which is also characterized by weak teeth, deficient in enamel. He says that there is no especial alteration in the form of the teeth, nor is the enamel uniformly defective and soft. It is wanting in irregular patches. There is perhaps no man living who has more carefully studied these questions of diathesis, development, and heredity than this distinguished Englishman, and the great value that he has been led to attribute to the teeth as marks and signs of constitutional vigor, or its opposite, and of normal, abnormal, or retarded development, is, to my mind at least, a marked

tribute to the great importance of the line of inquiry upon which we are now engaged, and which, as I said before, has not as yet been sufficiently followed up.

Of course, all divisions of human life into periods of years are merely arbitrary. A man's earthly existence is not like a ball-player running his bases. We do not reach one period of life, then stop running and wait for another chance. We advance pretty steadily from the cradle to the grave, developing up to our prime, and then gradually deteriorating until our enfeebled bodies will no longer sustain life. Of course some advance by more rapid strides than others, just as one man may run faster than another. Some children at five are as well developed as others at seven, and I believe that it is by the eruption of the first permanent molars that we are to judge of the completion of what we may call the first great physiological period of life. If all goes normally and well, "the six-year-old molars" should appear at six years, should pierce the gums without too great constitutional disturbance, should not be soft and carious, but firm and well formed, and the child should almost be unaware of their arrival. If all this happens, we may assure the parents that the child promises to grow up healthy, and may be now sent to school. Dr. Anstie, Dr. Day, and others have pointed out the evils of sending children to school too early, and putting upon the system, already taxed nearly to its utmost, the additional strain of study, confinement, and the bad air of the school-room. No young child should be urged or driven to study, and precocious children under nine or ten years of age should be held back rather than pushed forward.

If, however, the teeth are not normally erupted as to time, and are soft and perishable; if their eruption be attended with convulsions or other constitutional disturbance, the sign is as plain as a pike-staff that the child should be immediately put under a doctor's care. It is absurd and even criminal to attribute to the visitations of Providence what we have brought upon ourselves by our ignorance and folly. I ventured to assert above that the proper care of children during the first seven years of life has more to do with their subsequent health and development than any other factor, heredity alone excepted, and this, I believe, can be proved. It has not been proved upon a large scale, because it is not as yet possible to bring up large numbers of children physiologically. When, if ever, the flattering dreams of Mr. Edward Bellamy are realized, and individual life is merged in that of the community, perhaps children can be properly brought up. At that time the doctors will perforce

become communists,—because there will be so little for them to do. Nature has given us in children's teeth a sign which we cannot afford to neglect.

I think it can be easily shown that many of the morbid conditions and diseases of adolescence are due to the second dentition. In addition to the distinguished American physicians whose names I have just mentioned, I can give a number of others who attribute serious and even fatal maladies to the second dentition. J. Russell Reynolds says that there is no doubt that epilepsy may be caused by the second dentition. Erb and Heine mention teething as a cause of poliomyelitis anterior and spinal meningitis, and many other writers speak in a similar strain. Dr. Louis Starr has recently published a paper in the *Therapeutic Gazette* on the diseases of the second dentition and their treatment. Several writers, among others, Dr. Mulveany, of Brooklyn, have called attention to the association of hip-joint disease and the eruption of the first permanent molar teeth, the majority of cases of this complaint showing themselves between the fifth and seventh year. Dr. Mulveany asserted that he had never seen a case that did not begin during the period mentioned. He also gives some interesting cases of pseudo hip-disease in small children, all of them evidently too young to simulate the complaint. In one of these, so good a surgeon as Dr. Sayre is said to have been so completely deceived by the symptoms and history of the case as to have advised an exsection of the head of the femur, and actually to have cut down with the intention of removing this part of the bone, only to find that the joint was in a healthy state.

The cases all recovered readily after the complete eruption of the teeth. Dr. Starr says that the anterior molars generally give rise to more marked disturbance than do any of the teeth that replace the temporary set.

What Eustace Smith calls "mucous diseases" are more generally due to the second dentition than to any other cause or causes. I quote Professor Starr in the following description: "In this condition there is a nervous flux from the whole internal surface of the alimentary canal, which mechanically interferes with the digestion and absorption of food and greatly impedes nutrition. It may be met with at any time during the eruption of the permanent teeth. The affected child is emaciated and weak. His face is pale, though subject to marked changes in color. At times a circumscribed crimson flush appears on one or both cheeks. Again there is so much pallor, particularly about the lips, that fainting seems immi-

ment. The eyes are surrounded by bluish circles that deepen when the face pales; the conjunctivæ are muddy and there is occasional squinting. The skin is sallow, dry, and rough, and the hair lustreless and faded. There is decided pallor of the oral mucous membrane. The tongue is flabby, indented by the teeth, and glazed, and the breath is heavy and fetid. The appetite in the beginning fails, then becomes capricious, and finally is almost insatiable. Eating is followed by a sensation of drowsiness and by eructations of flatus and acid liquid. Tympanitic distention of the belly and pain are always present.

"Pain may be general when it amounts to a little more than a sensation of soreness, or, more frequently, it is limited to the left hypochondrium, and then is stitch-like in character. Either variety may be constant, or present only after meals; in the former case there is temporary increase of discomfort after eating. Paroxysms of severe pain about the umbilicus, with great pallor of the face, are sometimes observed. Constipation of the bowels is usual, and the evacuations which take place at intervals of two or three days are scanty and composed of small, hard, dark-colored lumps with a quantity of mucus. By day the patient suffers from headache, is languid and ill-tempered. At night he is restless, grinds his teeth, starts from sleep in terror caused by frightful dreams, screams or laughs incoherently, and for a time seems unconscious of his surroundings. Somnambulism and nocturnal incontinence of urine are quite common.

"There is no alteration of the temperature, the pulse is feeble, and there is frequently a slight dry, hacking cough, unquestionably due to reflex irritation of the larynx. The urine is diminished during the continuance of severe pain, but is voided in large quantities at the termination of the paroxysms.

"At intervals of two or three weeks violent vomiting and purging occur. During these attacks, which last from one to three days, a large quantity of mucus is expelled. There is slight fever, and the tongue becomes less flabby, more pointed, and covered with a thick, white, feathery fur, except along the sides, where several smooth, red, glazed patches of variable size and shape with irregular indented margins appear. The clearing-out process is followed by temporary improvement, but the symptoms slowly return and grow worse to culminate in another attack. The course of mucous diseases is very protracted, extending over months, and, while there is no regular progression, the symptoms tend to grow more and more serious as time lapses.

"Hacking cough, emaciation, and debility may suggest tuberculosis. A diagnosis, however, can be readily made by noting the state of the tongue, the mucous stools, the color and condition of the skin, the absence of pyrexia, except in the attacks of vomiting and purging, the periodicity of these attacks, the diurnal drowsiness and nocturnal terrors, and the irregularity of the course. At the same time, the outset of the symptoms after the commencement of second dentition is a point of importance.

"Mucous disease is not dangerous in itself, though by reducing the strength it predisposes to other and much more fatal diseases."

In another place Professor Starr says, "Diarrhœa is a very constant attendant upon second dentition. It is most apt to arise in the changeable weather of spring and autumn, and again the general depression produced by the coming of the second teeth would naturally favor the development of any constitutional tendency; and, having traced the connection in several instances, I have no doubt that not a few cases of tubercular ulceration of the bowels owe something to this 'etiological factor.'"

I have quoted at such length because the above is a good, even a graphic, description by an eminent clinician and writer of a common complaint of childhood which is generally referred to almost any cause but teething, as, *e.g.*, worms, the approach of puberty, malaria, etc. Dr. Jackson wrote that, since having satisfied himself of the etiological importance of the process of the second dentition, he had almost given up the use of worm-seed and other reputed vermifuges, because in his opinion most of the troubles imputed to worms were really due to something else.

A case is given of a boy of about twelve years of age who developed a chorea which lasted for several months and increased in severity; finally the lad fell into an epileptic fit. An examination of his mouth showed the gums over the second molars to be swollen and tender, and a free lancing of these finally relieved all of his symptoms. Fleiss gives a case of a small lad aged about five, who was preparing to cut his first molars; his anterior milk molars were lying half decayed in the gums, and near them were the edges of the permanent molars in a row. After a night of great feverishness, restlessness, and grinding of the teeth, the child arose in the morning with the left arm completely paralyzed. It was determined to extract all the carious teeth, in the hope of relieving the paralysis. However, the child was killed on the same day by an accidental fall upon his head. A post-mortem examination was held and showed, apart from the fracture of the skull, great con-

gestions extending from the roots of the brachial nerves on the left side to the shoulder, neck, and face. "There appeared to be no doubt that dentition had produced this state of the veins." We should note in passing a curious symptom and its consequences. Irritation of the gustatory branch of the fifth nerve perverts or destroys the sense of taste. This nerve, being the one principally involved in the process of dentition, is already in a state of irritation. The loss of taste takes away or transforms the appetite. The want of food or improper food may in its turn bring on chlorosis or hysteria, and indeed any of the complaints due to improper nourishment of the nerves, a condition in young women usually ascribed to anything except the teeth.

Concerning the nervous disorders of the second dentition, at the risk of wearying you I will quote again from Professor Starr's paper. He says nervous disorders, both sensory and motor, are encountered. "Headache is common; the pain is usually temporal and unilateral. It may be scattered, however, in the occipital region or in different parts of the face, and sometimes shifts suddenly from the temporal to the occipital region. It is lancinating, more or less constant, with no distinct intermission, and during its continuance there are restlessness, anorexia, a frequent hard pulse, sweating, dilatation of the pupil on the affected side, and perhaps dimness of vision, diplopia, and colored or uncolored spectra. One or more painful points can often be detected, and generally there is a hard, tender, moderately enlarged lymphatic gland in the sub-maxillary or cervical region.

"These attacks are due to disordered vaso-motor innervation, depending upon irritation of the sympathetic nerves and producing irregular contractions or spasms of the vessels (the temporal or occipital artery, as the case may be). The real source of irritation is to be found in the mouth. The mode of action may be twofold. First, from a swollen gum or carious tooth. The lymphatic vessels readily convey irritating matter to a neighboring lymph-gland, and the irritation here excited acts in its turn as a disturber of the sympathetic nerves, which furnish the vaso-motor supply to the carotid artery and its branches. This theory of the production of migraine has the value of the support of Lauder Brunton. The other method of production, and this I simply submit for consideration, is one of direct nervous connection, the sub-maxillary ganglion acting in the case of the lower teeth and the sphenopalatine in the upper as the medium of transfer of irritation to the vaso-motor nerves. The motor disturbances, while not so common as the sen-

sory, are more varied. Reflex spasm and paralysis of the eyelid have been noted. More extended paralysis also occurs. Dr. Brunton says, 'Sometimes, however, paralysis occurs of a much more extensive character, in consequence of dental irritation, especially in children. Teething is recognized by Romberg and Hensch as a frequent cause of paralysis, appearing in children without any apparent cause. According to Fleiss, paralysis of this sort occurs more commonly during the period of the second dentition, whereas convulsions generally occur during the first. Sometimes recovery is rapid, but at other times the limb atrophies and the paralysis may become associated with symptoms indicating more extensive disturbance of the spinal cord and brain, such as difficulty of breathing, asthma, palpitation, distortion of the face and squint, ending in coma and death.'

Besides the intestinal catarrh, already noted in growing girls, catarrhs of the vaginal mucous membrane have occurred, and have led to serious charges against the purity of the patient and to much family unhappiness. Dr. Mulveany, already quoted, has given an instance in a girl of ten years, which disappeared upon *lancing the gums* and instituting the simplest detergent treatment.

The same author gives a striking instance of enlarged cervical glands due to cutting the second molar teeth and the ease with which the true cause of such affections may be overlooked. A lad of fifteen, apparently in good physical health, was brought to a dispensary with the cervical lymphatic glands in the left side of the neck enormously swollen. The surgeon who brought him desired the opinion of his colleagues as to the advisability of dissecting out the glands. After considerable discussion, the patient having been examined by the other surgeons present, Dr. Mulveany inspected the mouth carefully and found that the upper and lower second molars on the affected side had not yet protruded and were irritating the gums. The boy thereupon volunteered the information that about a year previously the glands on the other side of his neck had been similarly affected, and that he had consulted some medical man who had cured (*sic*) him.

It is hardly necessary to add that the lad escaped a difficult and dangerous operation.

Many young girls show decided hysterical symptoms previous to the eruption of the second molars which are generally attributed to the approach of puberty. To the lay mind, at least, the approach of womanhood covers a multitude of pathological sins, and the allegation of this as cause of any symptom or set of symptoms is generally

quite satisfactory. Braxton Hicks has pointed out that puberty is due to a slow development rather than a sudden change. The female genitalia begin their growth *in utero*, and it is rather that their complete development is announced by the amplitude and rounding of the figure than that the essential organs of womanhood spring into complete and perfect existence just at the time when the form is beautified and the menstrual function established. In other words, arrival at puberty is only the completion of a stage of human development, just as the eruption of teeth is, and generally takes place shortly after the complete eruption of the second permanent molars. Indeed, it may be retarded or rendered painful and difficult by interference with dentition.

It is certain that cases of hysteria, chorea, and even epilepsy, are cured by lancing enlarged and tumefied gums over advancing permanent teeth, and the assumption that the difficult or retarded menstruation is due to the disordered state of the system caused by dentition is more in accordance with acknowledged pathological facts than that the disordered state of the system is caused by the delayed menstruation.

Dr. Garretson remarks, in his Oral Surgery, that while dentition is a physiological process, still it is like that of utero-gestation, one of continuous irritation. While I readily admit that the disorders and disturbances of teething are not solely due to the formation and eruption of the teeth, and I believe them to be chiefly due to the perfecting of important physiological changes in the brain, stomach, glandular and osseous tissues, going on simultaneously with the eruption of the teeth, I assert, without fear of contradiction, that the normal and peaceful eruption of healthy teeth is our best visible criterion of the progress of these processes and of the healthfulness of the system, and, on the other hand, delayed and irregular eruptions of the teeth as surely evince some constitutional vice or evil hygienic condition.

Dr. Mulveany, from whom I have already largely quoted, cites a case of a young woman fifteen years of age, who had suffered for years with a catarrhal ophthalmia which finally readily yielded to treatment after twenty-eight permanent teeth had been cut, to be followed in a fortnight by a copious, offensive purulent discharge from the vagina, accompanied by excoriations from the *mons veneris* to the anus, which naturally led to suspicions of unchastity. However, the simplest treatment cured the condition in a few days and the girl menstruated for the first time. Here was a case of catarrhal diathesis with local manifestations in the conjunctivæ kept up

by the irritation of dentition, which persisted in spite of treatment until after the eruption of the second molars. The dyscrasia then showed itself in another region, provoked by the unusual activity of the uterus (about, one might say, to enter upon its life business); after the function of this latter organ had been established the vaginal catarrh disappeared.

It is doubtless true that many morbid symptoms really due to dentition are falsely ascribed to the approach of puberty in both sexes. It is not asserted that the former is all-important, or even more so than the latter. It is only claimed that as a factor in the production of the diseases of childhood and adolescence dentition has not received due recognition.

Any unused function is gradually lost: We use all our muscles too little; our chests are narrow and our lung expansion small because we do not exercise our arms and our lungs enough. Our teeth are poor and our jaws narrow because we do not chew enough. Ambrose Paré spoke of a "rusty filth which attacked and destroyed the teeth and was chiefly due to the omissions of their proper duty,—that is, chewing."

I asserted in the early part of this paper that proper care and food in the first seven years of life would in my opinion have more influence upon subsequent development than any other factors whatever, heredity alone excepted. Perhaps the statement was somewhat extravagant. Let us consider it. Of course, by proper care, I meant proper medical supervision of the child and a thorough knowledge of the child's family history, so that the best measures might be taken to ward off the hereditary evils, which, like the evil spirits of which we read, are in constant attendance upon the helpless children, waiting to pounce upon them just as soon as some weakness or injury shall give the opportunity. Syphilis and tuberculosis leave their impress upon the children unto the third and fourth generation, but these tendencies can be successfully combated, even in the first, and it is our duty to study constantly all the conditions and all the signs of dyscrasiæ, of development, and of diathesis, that we may know what we have to combat and may have our weapons ready and burnished. The demons of disease and ill health have fastened themselves pretty strongly upon unfortunate humanity, and the best-directed efforts are feeble enough against them. But that does not excuse us from the eternal vigilance which is the price of nearly everything worth having in this life. I think that it is Professor Peirce who has pointed out that the teeth can be altered and developed by proper exercise, care, and

food. He alludes to the fact that the larvæ of the honey-bee are developed into a queen bee or into working bees according to the nature of the food they receive. As to practical suggestions, I have purposely avoided discussions of the treatment of particular diseases as I have gone along, fearing to make my paper too long, and because the treatment of special conditions is unimportant compared to the hygiene of child-life. Give a young child twelve hours sleep, plenty of sunlight, good air, and proper food containing plenty of phosphates, and he will develop that reserve of nerve-force which is needed to carry him through the emergencies of development.

Of the third period of our division a very great deal can be said. The hardships and vicissitudes experienced in getting the wisdom teeth and the general worthlessness of the product have engaged abler pens than mine, and I take it for granted that you are all more familiar with this part of our subject than with what has gone before, inasmuch as people suffering with their wisdom teeth are more apt to consult the dentist than the children and youth of whom we have just spoken; and also because of the more obvious and immediate connection of various troubles and the eruption or non-eruption of the wisdom teeth. However, there are certain physiological facts connected with this process which are not so generally known and which may profitably take up our time for a few moments longer.

There are many cases of eczema and other skin-disease, for example, which attack the young and which are often incurable until after the eruption of the third molars. You are all familiar with the acne of young people, which, commonly speaking, gets better and worse again during a period of years, but is finally cured after the completion of the second dentition. The connection of eczema with the eruption of the teeth is, like tooth-rash in the first dentition, more obvious, and it is probably more tractable to treatment when the irritation of teething is over than the acne.

The nervous diseases connected with the cutting of the wisdom teeth are even more pronounced than those that come earlier in life, and the reflex neuroses are at this time more marked. You are all probably familiar with some of the numerous recorded cases of complete blindness of one or both eyes, of deafness, of spasms, migraine, chorea, epilepsy, and insanity due to impacted wisdom teeth. Some of the functional disorders connected with the wisdom teeth are perhaps not so familiar. Dr. Anstie mentions a case of severe uterine neuralgia clearly found to be due to a carious tooth, which was not

itself at all sensitive. A case of alarming uterine colic in child-bed was, after ineffectual treatment, found to be due to an unerupted wisdom tooth, and was cured by the free use of the lancet over this tooth.

A curious case of vesical irritability is recorded in which the patient experienced pain in the teeth upon assuming the erect posture, especially when the feet touched the floor on arising in the morning.

Dr. Garretson gives a case of severe pain in a lower bicuspid tooth which was not relieved by extraction of the tooth, but was finally cured by curing an erosion on the inner surface of the fundus of the uterus. Hundreds of similar instances of reflex symptoms have been recorded. Dr. Mulveany says that he was frequently consulted by anxious young husbands because their youthful partners did not conceive. He always assured them that when their wives got through their teething they would have children, but that they were not likely to become mothers until quite over the infirmities of childhood.

I think that enough has been said to show that the eruption of the permanent teeth is by no means an unimportant process so far as it affects the health. Dr. Kingsley says that a perfect dental development is the result of well-balanced physical and nervous systems, without hereditary taint. "Abnormalities of development are due to disturbance of the trigeminal nerve during the period of the formation of the crowns of the permanent teeth. Neither lunacy nor insanity can have any direct bearing upon the development of the teeth, but would be most potent for evil if transmitted." The doctor continues:

"I do not hesitate to place it upon record that the next generation will see more of abnormality in dental development and an increase of nervous and cerebral diseases, and that the two are correlated and spring from the same cause, are not, strictly speaking, symptomatic of each other, but are associated and frequently have a common origin."

As dental irregularity is often accompanied by intellectual precocity, it may be said to be a sign of nervous excess in such persons.

As we glance backward over our subject we observe that the teeth of the permanent set which give the most trouble as they come through are those which do not replace milk teeth, *i.e.*, the permanent molar teeth. Their eruption may then be said to resemble the eruption of the milk teeth, and so it does. Convulsions, diarrhoeas, catarrhal diseases, etc., are more apt to show themselves with

these than with any other of the permanent teeth. Of these teeth, also, it may be fairly said that they resemble milk teeth in being of softer consistency and more susceptible to caries than the rest of the permanent set. This is surely true of the first and third molars. Many theories have been advanced to account for the perishable character of the first and third permanent molars. Perhaps the first are poor because they are erupted so early, some claiming that they should not strictly be called permanent teeth, that they are a sort of link between the two sets, and that they should be extracted in time to make room for the third molars, which, it is claimed, would be good teeth if they had a chance to come through the gums promptly and easily, and could be kept clear and free from crowding.

This is a pretty theory, but scarcely a tenable one. Our jaws are small, our teeth poor and crowded, chiefly because we eat too highly-prepared foods, and do not exercise ourselves enough in chewing.

Our growth should be ever peaceful and regular. This constant talk about over-strain, neurasthenia, etc., only means that some one has sinned, either this man or his parents, and I judge it to be generally the latter, that he (or she) is born with "nerves." If we lay the foundation well for our children and teach them to avoid our mistakes in matters of hygiene, we shall confer upon them benefits that wealth or learning cannot give. What I am constantly protesting against is the one-sided view of education that Americans entertain. We must educate—*i.e.*, draw out—the body and the mind; we must develop the chest, the arms, the backs, the jaws and teeth of our children, if we wish book-learning to be of any value to them or wish them to get any permanent good out of life or be of use in their day and generation.

Physical laws are God's laws, and if they are disregarded the punishment is swift and sure.

However, I am not one who takes a gloomy view of the physical future of the American people. I understood Professor Truman to say in your meeting last year that the teeth of our people are constantly growing better. I believe this to be true, and I believe that to our excellent and conscientious dentists much of the credit for this improvement is due.

When the laws of health are better understood, when the signs of a feeble constitution are more quickly read, when our people learn that building up and developing a normal body is really a simple thing, the Americans will become the finest race on the face of the earth.

ANEURISMAL TUMOR OF THE RIGHT ALVEOLAR
PROCESS AND VAULT OF THE MOUTH TREATED
BY INJECTION.¹

BY JOHN S. MARSHALL, M.D., CHICAGO, ILL.²

MR. C. B. H—, of Chicago, American, aged twenty-six years, occupation, travelling salesman, was referred to me, December 26, 1888, for counsel and treatment, by Dr. M. Stout, of Chicago, with the following history: Some eighteen or twenty months previous to this examination the gentleman had submitted to the extraction of all his superior teeth except the central incisors. The operation was performed under nitrous oxide gas; the mouth was badly bruised and lacerated on account of the difficulty in extracting the teeth. A few weeks afterwards he noticed a swelling upon the inner side of the right alveolar ridge, which continued to enlarge as the months went by, and prevented the making of the artificial denture, which he was anxious to have placed in his mouth. There was no pain or uncomfortable feeling about the tumor, except when engaged in vigorous exercise; at such times pulsation in the part would become very marked and disagreeable.

According to his own statement, he had "consulted several dentists in relation to the character of the swelling: some did not know what it was; one said it was an accumulation of pus, another that it was a 'watery tumor,' and a third that it was 'wind,' and asked the privilege of letting it out." This very kind offer, however, was declined, much to the permanent benefit and longevity of our patient.

Examination of the mouth revealed the superior teeth all gone except the central incisors, and a pulsating tumor about one and one-half inches in length, by one inch in width, egg-shaped in form, with the small end pointing forward, and occupying the right side of the vault of the mouth, from the outer wall of the alveolar process to the median line, and from the tuberosity of the maxilla forward to a line drawn through the cuspid region.

In character it was soft, fluctuating, compressible, and with very marked pulsation. In color it was slightly deeper in tint than the surrounding mucous membrane. Upon puncturing it with an ex-

¹ Read before the New Jersey State Dental Society at the annual meeting, July, 1890.

² Professor of Oral Surgery, University Dental College.

ploring needle, a jet of arterial blood followed its withdrawal, and continued to spurt for about half a minute, when the hemorrhage ceased.

The diagnosis was aneurismal tumor of the posterior palatine artery, with possible anastomosis with some branch of the superior maxillary artery, the result of injury in the extraction of the teeth. An operation was advised, and the gentleman agreed to report in about two months. Business engagements prevented his keeping this appointment, and when he next called to arrange for the operation I was out of town on my summer vacation. He was also on vacation, and could not await my return, and therefore sought other advice.

October 10, 1889, I saw him again, at which time he gave me the following additional history: That in July he had been operated upon for the removal of the tumor and had nearly died under the operation from hemorrhage, and was afterwards confined to his bed for two months with blood-poisoning.

The cast which I now show you is a copy of his upper jaw, taken on December 17, 1889, a few days before I operated upon him. You will see by this that there was no material improvement in the condition as described in the examination made a year previously.

The surgical treatment of aneurisms, as you all know, is by ligating the artery near the cardiac or distal extremity of the sac, or both; by compression, either instrumental or digital; by the introduction of foreign substances into the sac, like cat-gut, horse-hair, or fine iron or silver wire; by manipulation, by acupuncture, by galvano-puncture, by the injection of coagulating fluids, and in the case of small anastomosing or cirroid aneurisms by dissection,—the particular method adopted being controlled by the character and location of the aneurisms, the chances of danger to life, the possibilities of a cure, and the individual preferences of the operator. In all such cases as are susceptible of ligation, this is by far the most satisfactory surgical procedure. But in those which from their location cannot be reached by this method some one of the other means may be employed.

In the case under consideration treatment by ligation, compression, manipulation, acupuncture, and dissection was out of the question; the means at our command were therefore limited to three methods: the introduction of foreign substances, like wire, etc., galvano-puncture, and injection.

Treatment by the introduction of foreign substances, either ani-

mal or metallic, seemed slow and unsatisfactory, and gave little hope of success, for I had been unable to find a single case on record of a cure by this means, while the dangers from embolism were great.

Galvano-puncture was considered too tedious an operation, from the fact that several would most likely be required to effect a cure, while the dangers from embolism and from hemorrhage as a result of sloughing at the points of puncture made it seem extremely hazardous. I, therefore, decided to treat the case by injection, though this method is by no means free from the dangers already enumerated. The injection method in aneurisms of large arteries is generally considered positively unsafe; and in those occurring in terminal branches of arteries it has not met with much favor by the profession, chiefly for the reason that several fatal results from embolism were recorded soon after its introduction, and thus deterred many from giving it a trial in those cases which might be considered favorable.

The danger of this method in aneurisms connected with small arteries, it seems to me, is not in the method itself, but in the kind and strength of the coagulating fluids used.

The agents which have been suggested are numerous, among which are acetate of lead, acetic acid, iodine, ergotine, and the perchloride of iron. The perchloride has generally been given the preference, used in small quantities and weak solutions of one to two per cent.

The injection of solutions in the above quantity and strength produce very slow coagulation, and when the clot is formed it is soft and friable; as a consequence, it is easily broken up and floated away, giving rise to embolism in remote parts of the circulating system, with all its accompanying dangers. The dangers in acupuncture, galvano-puncture, and the introduction of foreign substances into the sac are for the same reasons equally great.

The perchloride of iron is a vigorous coagulant, and quite escharotic and antiseptic when used in full strength. A one- or two-per-cent. solution is very mild in its styptic and coagulant qualities, is not escharotic, and has no value as an antiseptic.

What is needed in the treatment of this class of cases is to produce a firm clot, instantaneously if possible, and to maintain it in an aseptic condition, without the dangers of sloughing or hemorrhage.

In the perchloride solution of proper strength it would seem that we had all these requirements.

By the production of instantaneous and complete coagulation

of the blood in aneurisms of this class and *nævi*, the dangers from embolism in remote parts of the body would seem to be entirely overcome and thus one great objection to this method removed; at least this was my thought upon the matter, and I determined to try it in this case, in preference to the other methods which might have been chosen.

In order to produce complete and firm coagulum instantaneously, it would be necessary to use a solution of much greater strength than had been previously recommended.

From the size of the tumor I concluded that in all probability it contained from one to one and a half ounces of blood, and that the introduction of five minims of the following solution, perchloride of iron one part, water four parts, would not be sufficiently escharotic to do any mischief when diluted with this quantity of blood.

On December 22, 1889, I injected into the tumor five minims of the above solution, which produced instantaneous coagulation, making the tumor feel as firm as a fibroma; considerable pain followed the injection, but this gradually subsided after a few minutes, but he complained for some hours of a strange fulness of the right side of the head. On withdrawing the hypodermic needle a little oozing occurred, which immediately discolored the mucous membrane for a little distance around the puncture made by the needle. No other unpleasant symptoms followed.

December 28 the mucous membrane, at the point punctured by the needle, sloughed, leaving an opening into the sac about the size of a silver half-dime, exposing the hard clot. There was not the slightest hemorrhage, but considerable anxiety was felt for fear of such an occurrence.

Tiersch's antiseptic solution was constantly used as a mouth-wash during the whole progress of the case, and after the slough occurred the sac was syringed with the same solution at short intervals, day and night.

December 31 the clot was broken up and removed, when it was found that the aneurism also occupied the antrum of Highmore, and had produced absorption of the palatine process of the superior maxillary bone and the nasal wall of the antrum, leaving a large opening into the nasal fossa. The case progressed without a single drawback from this time onward. The opening into the antrum and floor of the nasal fossa finally closed. There has been no recurrence and the patient considers himself perfectly well. Cast No. 2 shows his present condition.

Remarks.—The sloughing of the mucous membrane at the point of puncture proves that the strength of the solution was too great for absolute safety, and, should I be called upon to treat another case of this class, I should not feel warranted in using a solution stronger than one in six or eight parts of water. This, I think, would produce the desired results, without the dangers of causing a slough and possible hemorrhage.

PROPHYLAXIS IN THE FIELD OF THE DENTAL SURGEON.¹

BY CHAS. B. ATKINSON, D.D.S., NEW YORK.

PROPHYLAXIS presents four closely-related and two attendant aspects for consideration.

1. Prevention, properly a broad effort of education to teach to avoid.

2. Diet, a means of preparation of the system to assist prevention.

3. Hygiene, a regulation of circumstances closely governing.

4. Regimen, ruling of use of system, food, article, and circumstance, under the instruction of the preceding aspects; add to these operative and medicinal interference in the progress of disordered and diseased conditions, and the breadth of prophylaxis is before us.

Of prophylaxis, it is first required to subdue the ignorance of the public at large as to hygiene, diet, and personal care, so that teeth may be supported and aided to attain, and be maintained in, a healthful condition.

Publication under society endorsement, considering the feeding of mothers and children; exercise of the teeth, means of securing their cleanliness, and the commonly-occurring conditions resulting from accident, disease, and carelessness; their possibilities of repair, and the lines of care which control prevention of deficient function of the teeth, all come within the scope of this effort of prophylaxis.

A diet for mothers during gestation—indeed, suitable for any adult human organization—would include lean meat, fibre for muscle-

¹ Read before the New Jersey State Dental Society at the annual meeting, July, 1890.

building; starch producers for sugar, for carbon and acid reaction; fats in limited quantities, for carbon and lubrication; cereals (graham, rye, corn-bread, oatmeal), for bone formation; coffee and tea in limited quantities and of moderate strength, taken without milk, as digestive and nerve stimulants; turnips, spinach, cabbage, for intestinal residue; salt, of necessity; pure water, as a diluent; ripe fruits.

For babies artificially fed, some one or more acceptable manufactured food, barley-water, browned wheat-flour, with the addition of beef-juice expressed raw.

For children when weaned, barley and milk, lean meat minced fine, and particularly mutton, toasted bread, and crackers.

This is advanced with the hope that it may draw more light on the question of specific diet.

Hygiene and regimen call attention to general health of the body, indications in which connection are fresh air and exercise, regularly taken; frequent cool bathing, using little soap, but plenty of rubbing. The feet, as a rule, have but indifferent exercise, confined as they are by the coverings fashion dictates, and therefore they should receive especial attention in rubbing. It has been urged that rubbing with the hand from the extremities towards the trunk aids the return of the blood laden with effete oxygen and carbonic acid gas.

Only sufficient clothing for comfort should be worn (perhaps wool next the skin), particularly about the chest, armpits, abdomen, and knees; not too much about the throat. Further than this, thorough chewing is called for; careful brushing of the teeth, with powder occasionally, but regularly with some antisepticized soap, particularly at night (Buchan's carbolic tooth-soap is recommended); efficient daily use of floss silk; rinsing, gargling, spraying, or syringing with antiseptic preparations, such as salt-and-water, hydronaphthol solution, bichloride of mercury solution, peroxide of hydrogen.

These general phases prepare the way for attention to the systemic indications properly embraced in the professional employment of the dental surgeon, whether it be reflex action or inception of dental disease.

Disasters being subject to influence external to the body, are removed from consideration under the title of this paper. Nevertheless a certain degree of loss of tissue requires substitution to fulfil adequate prophylaxis. Inefficiency follows on any infraction of nature's design; but after this reaches a certain degree, substitu-

tion is imperative to secure against progressive destruction beyond the power of unaided systemic repair or endurance.

Caries of teeth call loudly for prophylactic attention; dyspepsia, catarrh (general and local), irregularity, constitutional taints and defects (influencing structure of tooth-substance), present important fields for investigation and the administration of efficient preventives, the control and subjection of the inducing element being the only positive, lasting prophylactic.

Mere temporizing with local manifestations of systemic derangement, although prophylactic, is so but in degree, and merely interrupts the expression of disordered function.

Prophylaxis should be more than this. The filling of teeth, their extraction and treatment, are all prophylactic as defending from more serious consequences, but not necessarily complete as an effort in that direction.

The filling of carious teeth in the mouth of a dyspeptic, for instance, is but a secondary phase of the prophylaxis indicated, and the lapse of time will develop further need for such effort again and again, until the eradication of the recognized predisposing antecedent, which, disregarding fractures, is believed is always one of either remote or immediate systemic aberration.

The filling naturally is indicated as an essential factor (as far as present knowledge guides us), but to this is added such further measures as are needed to complete the partial purpose of the filling.

Attention is directed to a treatment of oxyphosphate cement some time since presented in detail by the writer, which is believed to offer inherent medicinal advantages aside from an increased resistance to solution, which is believed is secured by the system.¹

Many times all further that may be presented to mind is instruction in the local care of the teeth and mouth.

In this connection, attention is naturally directed to the sanitary conditions influencing catarrh (as expressing the wide range of mucous tissue, debility, and consequent congestion attendant on various unsanitary conditions).

Also to adenoid growths, inducing mouth-breathing, with the attendant abnormal lung, nerve, and muscle action and inaction, and also of the common result in this condition of irregularity, which induces mal-occlusion, removing the possibility of proper exercise

¹ *Ohio Journal*, January, 1890.

of the teeth in chewing, which all come within the scope of dental prophylaxis.

In connection with sanitary conditions may be noted a perhaps not prevalent source of the propagation of disease, but nevertheless a matter of moment in itself, although one that is probably efficiently managed by all dentists, properly so called, and this is the absolute cleanliness of the instruments and appliances and hands brought into contact with the patient.

This matter has been lengthily considered recently by two medical gentlemen,¹ and the simple but effective method proposed of a receptacle containing water kept boiling, being within easy reach of the operating-chair, into which all instruments when used may be dropped and effectually sterilized.

It has the advantage of not discoloring steel instruments, as bichloride solution does, and when wiped dry they are *clean* and need only an occasional buffing, instead of the continual polishing the use of a bichloride solution necessitates.

A very urgent call for prophylaxis is heard from the sick-room. Prolonged invalidism is generally productive of extensive caries of teeth, and not unattended by several other grave lesions of the oral cavity.

A reciprocative irritation between the mouth and stomach and the whole mucous tract induces mutual pernicious influence one upon the other and back again to an aggravated condition which, were either, or both, controlled, would much lessen the gravity of many prolonged diseases, not to say avoid new complications, as, for instance, a carious tooth proceeding to death of the pulp, and abscess followed by necrosis of the maxilla, a frequent result of neglected abscessed pulps, perhaps the most frequent antecedent of necrosed maxillæ, although the neglect of a fractured alveolus (fractured in careless extraction) is also a prolific source of this condition.

What may we do to ward off disaster to the teeth and mouth during illness? The patient, his attendant or nurse, should be taught to pass the floss, if at all feasible, carefully, gently, yet thoroughly, between every space, once at least daily. This should form part of a nurse's training when preparing themselves for their vocation. The floss should be rendered aseptic, as also the fingers of the nurse, as carefully as when attending to a surgical dressing. The use of a brush is so awkward in the hands of another person

¹ Dr. Wight, before the Brooklyn Dental Society, in January last; Dr. Bulkley before the Odontological Society of New York, in April last, 1890.

that the patient would be likely to resent it. The floss can be kindly and acceptably used by another person, and should be. Following, the floss, antiseptic mouth-washes or sprays would be very effective in securing the patient from serious disaster, even in prolonged sickness. It is desired to protest against the use of orris-root or other fermentable substances in tooth-powder, although orris-root has been distinguished as a component of tooth-powder for long years, and it is to-day prescribed by physicians and in sickness. It is time that it be replaced by some efficient non-fermentable substance.

Systemic disorders, as dyspepsia, general catarrh, kidney and lung diseases, rheumatism,—all in themselves results of malassimilation,—furnish opportunity for the incitement of pyorrhœa alveolaris,—a disease primarily induced (in its restricted local aspect) by a lowered tone of gum-tissue and blood-vessel coats, permitting congestion to present an initial stage, followed by distention, disruption, and solution, until suppuration removes the myxomatous tissue in such quantity as to call upon the system for a sufficiently accelerated blood-supply to terminate the local manifestation, usually after the loss of all the teeth and alveolar processes (which have been the framework about which the loose, coarse gum-tissue was formed).

Peripheral relaxation is a reasonable sequence of deficient central nerve-tension. Malassimilation being at the seat of the beginning of nutrition, presents a constant factor in disease in every one of its aspects.

Were proper food properly assimilated, disease would be unknown.

The study of individual requirement based upon individual structure, endowment, and environment, embracing physical, mental, and circumstantial characteristics, seems to be the line of investigation that will present facts upon which to predicate acts of guidance (advice), which offers the highest expression of professional service, prophylaxis.

This advances dentistry to an ideal position.

In the mean time we must do the best we can, and make efforts looking to this ideal result in constant investigation and the continual advancement of our educational plan, and by no means the least effort we may make to this end will be the persistent education of the general public to an understanding of conservative health, hygienic measures, and an intelligent comprehension of the possibilities of repair within the ability of modern dentistry, looking to an eradication of disease, gradually but surely.

TREATMENT OF PROXIMATE SURFACES.¹

BY W. H. DWINELLE, M.D., D.D.S.

I HAD thought that this subject of contours had been exhausted long ago. It has been a constant theme with me, and one which I have advocated for nearly forty years. Dr. Perry's admirable essay on the treatment of proximal surfaces, read before the Odontological Society of Pennsylvania, seemed to make it impossible for anything further to be said on the subject, but by Dr. Wilson's paper we have been treated to an entertainment pertaining to the matter so fresh, original, and in many ways so new that we are almost ready to question whether the subject had been thoroughly discussed after all.

I have so identified myself with the subject of the paper, and advocated its theory and practice for so long a period, with more or less opposition, that I take pleasure in thanking the essayist for his able and admirable reminder of principles which reach back to the teachings of nature herself.

And here I will put in a plea for nature. From time immemorial it has been the highest aim of art to imitate nature. She has ever been the great example which we may continually approach yet never reach; and those productions will ever be considered most perfect which most nearly resemble her own.

The wisdom of contouring teeth to their original form seems to me to be one of those self-evident propositions which is beyond all question. It ought to be quite sufficient for us to know that it has the seal and approval of the Divine architect himself, who created nothing in vain.

The uses of the contour forms of the teeth and the mechanical principles involved in them we may partially enumerate, but it is foolhardy for us to assume that we can comprehend them all. We have no right to impeach the wisdom of the Almighty and limit His infinity down to our poor finiteness. We have no right to repudiate and reject His sample copy given to us for imitation; it becomes, in a certain sense, sacrilegious for us to do so, for it assumes that ours is superior to the source and embodiment of all wisdom, whose knowledge and experience antedates eternity itself.

I might dilate on the beauty and wisdom displayed in the for-

¹ Read before the New York Odontological Society, March, 1891.

mation of the two dental arches, of which a single tooth, with its many qualities and functions, is an integral part, but I forbear.

To understand the laws of nature and her plans so far as possible, and accept and apply them, is our first duty.

When you have restored opposing surfaces of teeth to their original contours, so that their approximal sides meet at their largest diameter, taking care to faithfully close all the *joints* of their walls down to the very surface of the enamel and Nasmyth's membrane, which, as you know, is akin to fluor-spar, whose integrity fluoric acid alone can impair, you have virtually restored it to all its functions as of old and secured it in its position in the arch, and have done all that art can do and reached the highest approximation to nature. It seems to me to be folly for any one to question the wisdom of this course and advocate in its place the mutilation of the teeth and flat fillings with exposed enamel and dentine borders, together with the mechanical and physical disadvantages that always follow operations of this character. It has been objected that teeth when contoured become thereby frail and are easily broken down and destroyed. In a treatise I wrote on this subject in 1855, when contour fillings were first advocated, I demonstrated that, by proper anchorage and undercutting, the teeth are so locked and banded together that the crown becomes stronger than by treating by the old methods. In case of treating a tooth that has lost its vitality, the pulp-cavity can be so utilized that a broad column of gold can be built up from its centre that will be sufficient to enable the contour to resist any force it might meet with.

I frequently see contour fillings made in this city more than thirty years ago which are as perfect to-day at their cervical borders and in all their appointments as though they had been completed but yesterday. Many of these have been seen and approved of by gentlemen present.¹

I cannot approve of the practice of slicing off a quarter or third of the enamel and dentine from a tooth and leaving the remainder to the possibilities of a flat filling. When we consider the construction, economy of, and the relation to, and position of the enamel rods, it would seem like displacing the key-stone of a succession of arches, thereby endangering the entire superstructure.

¹ I have advocated the practice of contour fillings for nearly forty years, and my daily and constant observation in the practice of others continually confirms me in the faith.

To those who contend that flat fillings are superior to the contour, which restores the tooth to its original form and function, I would simply say that they assume that a fraction of a tooth is superior to the original tooth itself. Any deviation from the strict construction of the *contour* must be on the ground of *expediency*, which we admit qualifies every operation that passes through our hands, but that a duplication of nature by art is superior to a partial success in that direction, it seems to me, is admitted by all.

I could refer to some of the objections to flat fillings, among others that all normal articulation is virtually broken up, thereby bringing with them a train of evils apparent to every one, so that teeth thus treated lose their character as teeth in a large sense, but I forbear.

The discussion of this subject is suggestive of the old inverted aphorism that "a part is greater than the whole!" I think I cannot better conclude this brief article than by quoting, *first*, from Dr. Perry's paper, already alluded to, where, after reviewing the subject of contours in a manner both exhaustive and entertaining, he summarizes the whole by saying, "Get free edges, if possible, for your approximal fillings, and shape them to the original outline of the teeth;" and, *secondly*, from Dr. Allan's very able paper, read before the annual meeting of the First District Society, January, 1890. In commenting on this afterwards, Dr. Allan said, "I am sorry my meaning has been lost. Read between the lines.

"I intended my paper to be a strong argument in favor of contour work. I am ready to say that, where all indications are favorable, the contour work is both theoretically and practically the best."

This is all we contend for, and admits the whole question.

If not practical and inexpedient, do not do it. If practical and expedient, *do it!*

THE ORGANIZATION AND DISEASES OF THE TEETH.¹

BY E. G. TUCKER, M.D.

MR. PRESIDENT AND FELLOWS OF THE ACADEMY,—As an *important branch*, I have selected that which relates to the organization of the teeth and a few remarks on the technical phrases of the teeth and diseases.

In attempting to explain the organization of the teeth, I shall not fatigue you with long and tedious recitals, or attempt a refutation of those propositions which neither result in a clear conviction of truth or useful knowledge, by doubting the very existence of my person and of others around me, until logically proved to exist.

That no reasoning of mine or of the ancients will be necessary to convince you, without the aid

“Of ancient critics
Although profoundly skilled in analytics,”

I find it difficult to summarize the many opinions advanced. Those who are acquainted with the writings of Fauchard, Monroe, Audibran, Robert Blake, Duval, Fox, Fitch, and Thomas Bell, or know the opinions of intelligent practitioners, doubtless think the question so well settled as to render further argument unnecessary.

The famous Mr. Lawrence, of London, published in the *Medical Gazette* of June, 1830, his opinions, and attributes all diseases of the teeth to a “chemical action.” To say nothing of the absurdity of calling diseases a chemical action, I would ask, How then can these affections be inherited or constitutional? That many are so is not only a popular belief, but a truth to be learned by a very little observation. We see children as often resembling their parents in *dental* as in pulmonary or in any other peculiarity, complexion, etc.

The expression “the teeth of all our family go just so” is not only an assertion which a dentist has almost daily to hear, but one which *facts* compel him to give his assent.

Numberless facts on this point might be collected, but proof is not needed. Every candid observer can convince himself of the truth in one week, if such proof be necessary.

In many cases the application of cold or hot substances, and more

¹ Read before the American Academy of Dental Science, Boston, February 4, 1891.

especially of sweets or acids to parts denuded, occasions sensations so disagreeable as to render it difficult to convince the patient that the nerve or pulp is not exposed.

Teeth possess this irritability at times and at all periods of life; differing, of course, in degree like all other irritability or fretfulness in different individuals. The enamel is devoid of sensibility, but there is no other part of these organs which does not possess it, as bones do. Now what is it that is thus transmitted from one generation to another? Is it a liability to a chemical action, or are the teeth, like the lungs and other parts, rendered liable to or exempt from disease?

The late Dr. Harwood, of Boston, had a variety of specimens of diseased roots, and no one who examines them would hesitate to ascribe the peculiar appearance they present to genuine exostosis, not only the surface, but the substance of the superadded parts is of a very hard and dense texture, of a yellowish hue, and before being dried was semi-transparent. The roughness presents a striking contrast to healthy roots. Where does this matter come from, and how comes it to be so firmly united with and forming, as it were, a part of the root?

If it were a mere deposit, it would be easily separated from the original bone. It seems to me that the occurrence of this disease proves the existence of vessels in whatever part it may happen, and we might believe that the phenomena presents a morbid growth of the parts.

Chemistry has done wonders, but I am hardly prepared to believe that exostosis is one of its products.

I have seen teeth that have been buried more than one hundred and fifty years, but they presented none of the appearances just described. Nothing in fact does resemble a tooth thus affected but necrosed bone, and if not removed by art, nature accomplishes the thing herself.

These unorganized *pegs* not only manage to imitate diseases but counterfeit resemblance to them remarkably well. When by accident or design a portion of the enamel is removed, the exposed bone becomes irritable, but with proper treatment the tenderness in most cases disappears. Where this has happened, and the bone continues healthy, it is found, on close examination, that it has become much harder than ordinary bone or dentine, and that the surface has assumed a peculiar bright, glossy appearance; such facts have, no doubt, given rise to the erroneous idea that a new enamel is sometimes formed. Now, here is not only a modification of sensi-

bility, but a change of structure which must depend upon vitality and organization as much as dental gangrene.

The diseases of the teeth have not received that attention desired heretofore, except when felt; then came the cold iron, an evil nearly equal to the prior one. The work of destruction is now and then interrupted by some internal power, and the organ remains for years.

I cannot pass this point without making a short digression, for which I hope to be pardoned. The vulgar phrase "rotten teeth" is not merely an indecent one, but it conveys to the uninformed mind an utter falsehood, and, I fear, is not always used with a proper understanding by those who should know that the teeth are incapable of such a process as rotting, any more than the flesh of a healthy man. That process which is termed "rotting" of teeth, or, sometimes, for decency, "decaying," ends totally at death, and never is or can be continued in the grave.

Extract a tooth and you immediately stop its so-called "rotting," nor can you by any means make it go on except under artificially produced conditions similar to those that caused the decay in the mouth.

In most cases, if people knew the nature of the evil, they would attend more to the prevention, if not to the cure.

Cleanliness would at least be attended to, and I honestly believe that half the teeth that are lost might be saved.

People may have foul mouths full of corrupt substances, and thus inflammation and decay may be produced in their teeth; but let them be told and made to understand that their teeth can take on no such process until after they are softened and prepared by disease, which is in most cases easily prevented or cured.

Physicians, of all men, should be careful how they use this ill-chosen phrase. It has a technical and generally understood signification; its legitimate application is to *dead* matter. If, therefore, you tell a man that his teeth are rotting, you virtually tell him that they are in a hopeless condition, and he acts accordingly in nine cases out of ten.

The late Dr. Flagg succeeded in coloring the whole tooth by mixing madder in the animal's food, and also Dr. Fitch, of Philadelphia, states that he had several specimens of extracted teeth of a plethoric woman, aged twenty-seven years, who died of a violent inflammatory fever, and the teeth were completely injected with red blood.

We see the roots covered with periosteum like other bones, and

a large number of vessels enter this membrane of such magnitude as to bleed profusely when torn asunder.

Is it philosophical to suppose that *arteries* and *veins* are sent thither for the mere purpose of coming back again? or that the nerves that accompany them have no other end to answer than that of subjecting us to the vexation and madness of toothache?

We know that teeth can be transplanted from one jaw to another; which, though injudicious, has in some instances been successful.

There are few organs which are more important in the influence which they exert upon the general health than the teeth, and there are few diseases so much neglected and which receive so little attention from the hands of the medical practitioners. Lately, however, they seem to have greatly changed, and their reluctance heretofore manifested is giving place to more rational views, and we find now many of them ardently devoting themselves to what was once considered beneath the dignity of their calling.

A grave impression, somewhat prevalent, is this: that the diseases of the teeth are a natural consequence, a process of nature which none are exempt from, and that it is not within the power of the dentist to check its ravages.

An interrogatory very often sounds in our ears, namely, "Why, if filling the teeth is so essential, how is it that we find so many failures?" The solution of the query is, that such persons or services as would insure success have not been employed for the sake of economy, instead of which an empiric has been called upon to do the work.

There are many persons in the world who are too "*penny-wise*" to make use of any other wisdom, judging the dental science to be a mere mechanical one, and, to use the words of another, "this is the rock on which they split."

However natural it may be for us all to indulge in a partiality for those subjects which have engaged much of our time and attention, yet every one must agree that the advantages of this art, aside from its effects upon the general health, are sufficient to excite our laudable and generous efforts in diffusing its principles in the community. The vast importance of preserving the organs of mastication and articulation is apparent to every one, as an indispensable requisite to sound bodily health, for there are many affections which arise solely from the diseases of the teeth, such as dyspepsia, tic douloureux, etc. Still, there are no operations in surgery which, when performed as they should be, are more certainly successful in their results.

DENTAL EDUCATION.¹BY HENRY LEFFMANN, M.D., D.D.S.²

For some years a wholesale agitation has been in progress concerning the necessity of improving the standard of education in those professions which have to do with the prevention or treatment of disease or with procedures affecting the rights and privileges of the citizen. The medical profession proper has, of course, received the greatest share, but some attention has been given to the question of advancement in dental education and to the importance of establishing exact methods of instruction in hygiene and medical jurisprudence. No doubt the day is not far distant when we will see special degrees granted in these branches, after definite courses of study and examination.

Dentistry has enjoyed among all the specialties of medicine what might be called an "evolutionary" advantage, it originated without the domain of medicine proper, and has been growing into it slowly, and as when some town or country, with special political privileges, annexing itself to a larger territory, carries with it by agreement certain rights, so the science of dentistry is vouchsafed a degree of independence much greater than is accorded to those specialties which are just budding from the parent stem. No one is disturbed at the conferring of the special degree of doctor of dental surgery; but the corresponding degrees of doctor of ophthalmology, otology, dermatology, are yet in abeyance, and the proposition to confer them meets either with opposition or indifference.

I have always regarded with satisfaction the fact that I was one of a small company of dentists that assembled in New York City a few years ago and started the movement for advance in the thoroughness on dental education by terminating the one year system, and establishing the compulsory two years' course. The results of that reform have been very gratifying; all who teach in dental colleges see the great advantage that accrues when the student is given ample time for acquiring a knowledge of the science and art of the profession which he is to practise. At the present time we are on the threshold of another extension of the

¹ Read before the Pennsylvania State Dental Society, July 29, 1890.

² Professor of Chemistry in the Pennsylvania College of Dental Surgery.

course, namely, to three years. While I have no doubt that such extension will be of benefit, yet I think it may be a question whether there might not have been general reforms brought about in other features in the course of instruction more urgent than is the further extension of the lecture course.

The principal obstacle to advancement in this field is the difficulty of securing uniformity, and an honest adherence to the proposed plans. The majority of the medical and dental colleges of the United States are unendowed and dependent on their students for support. However disinterested the utterances may be, it is not in accordance with general human nature that any faculty should deliberately cut down its revenues by wholesale unless under some strong public pressure or special emergency. The establishment, therefore, of preliminary examinations and higher standards of final examinations comes but slowly, for as the sole judgment on such matters rests with the individual college, there will be always abundant opportunity for unscrupulous men to deal unfairly with their co-workers, and bring about what has been well called "the downward competition of the schools." It is possibly for this reason that the standards fixed for the colleges have generally been such that evasion is difficult. A college may, for instance, advertise that it requires a preliminary examination and a high standard of final examination, but it will be difficult to make certain of these; but it can, however, be seen at once, if it has a certain number of branches represented in its curriculum, and requires a certain term of study and a certain number of such terms.

It is curious that, just as the medical colleges are agitating the advisability of increasing the course of study to four years, and the dental colleges about entering upon a three years' system, some of the leading colleges in arts and general science are advocating a shortening of the course for academic degrees from four to three years. The reason alleged is that many men can acquire in three years what others will only acquire in four, and that it is unjust to the better class to compel them to lose a year. The same argument applies to those who enter for professional degrees. Many can absorb rapidly all the theoretical instruction, and their progress is necessarily delayed by the weaker classmates. There is, however, in the academic institutions, generally, a condition which secures the rapid and successful progress of the student to an extent not yet available in colleges conferring professional degrees; that is, the extent and stringency of the preliminary examination. If a young man or woman desires to enter for one

of the degrees in arts or sciences at a reputable college, a definite amount of preparation is necessary, and when once entered upon the list, the teaching faculty can make a close estimate of the capacity of every member of the class, and each member is aware of the degree to which he can presume a knowledge of the fundamental principles of the science he may be teaching. Thus, if the entrance examination include a knowledge of elementary physics, it will not be necessary to stop to explain the significance of specific gravity, nor the nature of a thermometer. Such aids are, with very few exceptions, not at hand in the colleges for conferring professional degrees. It is true that with many institutions an effort has been made towards preliminary requirements, and some good has been accomplished in this manner, but it has, I think, been operative largely in deterring unfit candidates rather than raising the general standard. We still find, side by side upon the same benches, the student who has read Cæsar and solved quadratic equations and the student who does not know what is meant by a genitive case and has no idea of abstract quantities.

The remedy for these deficiencies lies, I believe, in State supervision. I regret that I must come to this conclusion, for I have always been opposed to interference by the constituted authorities with the general conduct and freedom of the citizen. But no one can fail to note the beneficial effect which has been exercised by State Boards of Examiners, and it will be of advantage when their powers are further extended. We have waited many years for the colleges to come up to the same high standard, and it will be necessary to force them up to it. What is needed in the case is uniformity and definiteness in the requirements, and this can only come when those requirements are determined by legalized authorities and enforced without fear or favor on all who wish to enter the profession. The sole duty of the college is to teach; it should be relieved from the necessity of soliciting students or granting them license to practise. The latter function is a prerogative of the State, and should be reserved to it.

If we turn for a moment to the practical example of how colleges have to deal with the problem of increasing the term of study, we find that in most cases a serious mistake has been made. One of the reasons for the increase has been the necessity of more thorough instruction in the theoretical branches, and yet, in most cases, the amount of time given to such branches is not materially increased, nor are the requirements for entering upon their study advanced. If a college changes from two to three years, it will be

found that, very probably, the professor of chemistry or physiology will not have any more lectures. The principal change will be that the student will drop these studies in the third year, and that the whole work will be spread over an extra year. It is true that there will be less crowding, and more opportunity for accessory reading, but, as a matter of fact, the most valuable teaching is that which is done in the laboratory and lecture-room, and the student's own studying is largely for examination. The various fundamental branches which make up a course in medical or dental science should be carried through the entire course. Some of the applications of physiology and chemistry are only to be appreciated when the more advanced details of the practical departments have been acquired. A proper arrangement of the extended course is, it seems to me, to use the extra year as a preparatory year. Instead of making a third (or fourth) year devoted only to the so-called practical branches, this year should, as heretofore, include all the fundamental branches, but the first year should be exclusively devoted to preparation for the study. Thus, in a dental college, I would not have any clinical work done during the first year, but the principles of physiology, histology, anatomy, chemistry, and metallurgy should be taught. Practical anatomy should be limited either to the study of the manikin, or the dissection of some of the lower animals; both of these methods are more economical and satisfactory with new students than the use of human cadavers. In the second year the application of chemistry to physiology and pathology should be begun, materia medica, prosthetic dentistry, dissection of the human body, dental physiology, pathology, and dental practice. The third year should be devoted to operative dentistry and oral surgery, therapeutics, and organic chemistry, with special lectures on dental hygiene, etiology, and prophylaxis. At the end of each year examinations should be held to determine proficiency in each branch, and students should be compelled to acquire a reasonable degree of knowledge before being passed in any branch, and under no circumstances should proficiency in one branch be permitted to atone for complete deficiency in another. I also think very well of the plan of setting before the more able pupils some inducement to greater work than the curriculum calls for, by conferring the degree *cum laude* upon such as comply with extra requirement.

So far as the preliminary examination is concerned, it should include a knowledge of such branches as will aid the student in understanding the lectures. From an experience in this field,

extending over twenty-one years, I am satisfied that a great many pupils understand much less of the subjects they study than even is commonly supposed. I have found, especially, a deficiency in elementary arithmetic, which is necessary to the comprehension of many demonstrations in chemistry and metallurgy. Spelling and grammar are, of course, always defective, and the preliminary examination should include some work in those topics. Unless the college course provides for a definite course in physics during the first year, some knowledge of the elementary physics of light, heat, and electricity, and specific gravity should be insisted upon. As a rule, it will be found that the only way in which to secure uniformity in such standards of admission is to test them by actual examination, which should be in writing, public, and of record. Certificates of proficiency, unless of very definite character, are apt to be misleading.

So far as the final examinations are concerned, I hold that in dental as in medical colleges they are matters for the State. The duty of the faculty ceases when the pupil has been given a conspectus of the present state of the art and science of his chosen profession. It is highly advisable, of course, that the college should test by examination the degree of proficiency by any method it may see fit, and that it should be empowered to give any form of certificate to attest this fact, but the entry upon the practice of the profession is an act which concerns the community, and to it, therefore, belongs the exclusive right of permission. Every guard should, of course, be thrown around the administration of this right. It should be public, uniform, and of record, and should be under the partial supervision at least of the teaching bodies, but not controlled by them.

Unfortunately, for the reasons that I have pointed out, many of these reforms are not immediately attainable. Much opposition yet exists to official control, and some colleges continue to profess a desire to enforce a high standard; but the knowledge that these professions cannot be sincere prevents other institutions from discarding old methods. We must await a gradual development of public opinion, but I am confident that a good preliminary examination, a graded course arranged in accordance with the requirements of modern science, and a State board of examiners with sole power to admit to practice will accomplish all that is needed in dental education.

IMMEDIATE ROOT-FILLING.¹

BY J. A. LIBBEY, D.D.S., PITTSBURG, PA.

AT a recent meeting of our local society I gave a clinic on immediate root-filling. There was so much interest manifested in the discussion which followed that I was requested, by a vote of the Society, to read a paper on the subject at this meeting. Whether it was done as a punishment for my deserting the old beaten path, or that I might help some others out of the annoyance so often experienced by continued treatment, "deponent sayeth not."

There is no part of our profession in which I have labored harder than in the treatment of pulpless teeth. The annoyances I have frequently had and the discomfort of the patient has kept me on the lookout for a better mode of treatment. Having tried nearly everything I have heard of, I have finally adopted the following, which I will give in as plain a manner as I can, after which I will cite a few cases from my records for the month of May, which alone are sufficient evidence that it is not so risky as many seem to think.

First, place the rubber dam on the tooth and keep others for convenience, ligate each tooth exposed to view, to be certain of excluding all moisture and prevent alcohol or chloroform from escaping into the mouth, and open into the pulp-chamber so as to get as direct access into canals as possible. With a Swiss jeweller's broach, annealed quite soft, explore the canals, and then with a few fibres of cotton wrapped on the broach clean out the decomposed tooth-pulp. This should be continued until the cotton fibres show very little, if any, moisture. Then use a permanganate of potash solution, one drachm to the ounce, dipping the broach and cotton into it, and introducing it into the canals, repeating this until it shows no discoloration. Second, with an abscess syringe alcohol is injected into the canals; then dry with hot air, repeating once or twice. The best hot-air appliance I have used is the compressed air-cylinder and accompanying apparatus, demonstrated at a previous meeting of this society by Dr. Register. When thoroughly dried, inject wood-creosote into the canals, either with syringe or broach and cotton, and with a bare broach assist it to the apex. Then inject sufficient chloroform to fill canals, and use

¹ Read before the Pennsylvania State Dental Society, July 29, 1890.

broach again to assist in expelling the air if any should be left in the canal. This is done to exclude the air, and as a carrier for chlora-percha. Before the chloroform has time to evaporate, inject chlora-percha into the canals, and fill the cavity about half full. Then stretch a piece of heavy rubber dam over the cavity, and hold it in this position, and with a ball-burnisher tap at first lightly over the cavity, then increase the force, but not sufficient to puncture the rubber, this will force the chlora-percha into the canals. I am indebted to Dr. Whitesides, of Youngstown, Ohio, for the use of the dam in this manner as well as other hints in this method of root-filling.

With gutta-percha points, previously prepared, of suitable size inserted into the canals, with nerve-canal plugging instrument pack as thoroughly as possible; then warm a piece of gutta-percha of sufficient size to cover the bottom of the cavity, and use a ball-burnisher vigorously. If the patient shows any sign of pain from the pressure, I desist at that point, feeling satisfied the gutta-percha has reached the apical foramen. I usually fill the cavity with gutta-percha and make an appointment for permanent filling.

If there is a fistulous opening on the gum I try in every case to have the chlora-percha make its appearance through it on the gum.

Now, you will observe I have not classified particular cases. I care not whether it be—

1. Those which are in a healthy condition.¹
2. Those which are in such a state that slight causes of irritation may excite periodontal inflammation.
3. Those of which the periodontal membrane is inflamed; or
4. Those which have been the subject of alveolar abscess, and which are discharging through a fistulous opening.

The following cases, it seems to me, will be sufficient to prove my assertions:

Miss S., aged sixteen; light hair, light blue eyes; called latter part of April; left inferior first molar with large coronal cavity; pulp almost devitalized; tooth quite sore to the touch; extracted the remaining portion of pulp, and treated with wood-creosote on cotton placed loosely in canals, and closed the cavity with cotton saturated with sandarach varnish. The patient returned a few days later with slight soreness; the treatment was repeated as at first. This treatment was continued, alternating with creosote

¹ Classification of Dr. Jack, American System of Dentistry, vol. ii. p. 189.

and iodoform until the fifth treatment. On Friday, May 9, patient returned, and complained of increased soreness to the touch, worse than at any time since first treatment. Up to this time I had not sufficient confidence in immediate root-filling to attempt it with this class,—No. 3. I concluded to fill the canals at this sitting, and filled the cavity with gutta-percha. On Sabbath afternoon I passed her home and saw her sitting on the porch; she called me and said, "I wanted to tell you my tooth is all right, the soreness is all gone!"

Filled permanently June 3.

2. Mr. R., aged about forty; occupation merchant; called May 12; right superior cuspid quite sore to the touch, and upon exploring with a broach in the canal pus flowed out followed by slight bleeding; no fistulous opening. I filled the canal and cavity with gutta-percha. The patient complained of increased irritation that evening, but next morning was much better, since which time there has been no soreness.

3. Miss D., aged eighteen; filled root-canals of right inferior first molar May 13. She had previously been treated five or six times. She was compelled to remove the cotton and sandarach within a few hours, with the exception of the last two treatments. Upon removal of cotton, pus flowed into cavity. This was the condition at this date. No irritation after filling canals.

Filled permanently May 20.

4. Had been treating left superior second bicuspid for Mr. V., aged forty, for the past year, and had closed up temporarily three or four times. Inflammation of the peridental membrane continued. Called May 22 by appointment, and wanted to change his engagement on account of the tooth being sore to the touch, filled root at this sitting as described above. Called July 11; said the last treatment—i.e., May 22—was the best yet. After the next day there had not been any irritation.

5. In the clinic alluded to in the opening of this paper, the patient, a young lady, aged about twenty, the tooth filled at that time was the right superior first molar, and had not had any previous treatment. After the roots were filled, I prepared the cavity on the mesial surface and filled about half full, using hand mallet, with soft gold-foil, No. 4.

I selected this patient for the clinic because on May 17 she came to me with right superior central and both laterals mere shells, and with fistulous openings on the gum. I commenced to open into the canal of the central incisor. I treated with creos-

sote and closed the cavity with cotton, saturated with sandarach, and made an appointment for the 24th. She came back the next day with swollen face. I removed cotton and recommended roasted figs on the gum.

The next week, at the time appointed, I filled all three roots, forcing the chlora-percha through the fistulous openings. May 3 I placed crowns on the three roots. At the time of the clinic, the fourth Thursday of June, all had a healthy appearance: the pink gutta-percha could be seen under the mucous membrane over the left superior lateral, as members here can testify.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

THE regular monthly meeting of the New York Odontological Society was held Tuesday morning, March 17, 1891, at eight o'clock, at the New York Academy of Medicine, No. 17 West Forty-third Street.

The President, Dr. W. H. Dwinelle, in the chair.

INCIDENTS OF OFFICE PRACTICE AND CASUAL COMMUNICATIONS.

Dr. A. H. Brockway.—I would like to relate a little incident of practice, called to mind by reference, at the last meeting, in Dr. Rollins's paper, to galvanic action in the mouth, from the proximity of fillings of different materials. The incident is as follows :

A lady patient came to me, some months ago, for an appointment, complaining that she had very singular sensations in her mouth, which she attributed to galvanic action. She is a woman of remarkable intelligence, and I was somewhat impressed by her statement. Endeavoring to ascertain the cause of the galvanic action complained of, I discovered two newly-formed cavities in the proximate surfaces of adjoining bicuspid teeth, rather obscure cavities, and at once suspected that the cause of her sensations was there. I filled those cavities and it put an end to the galvanic action of which she complained. I question if disturbing galvanic action from the presence of differing filling materials is as common as some suppose. I am not sure that I have ever seen a case of it except from the contact of different fillings in opposing teeth when the jaws are brought together.

Dr. Van Woert.—I have with me a patient whom I presented to Dr. Brockway while at my office last Sunday ; and it was at his suggestion that the case is brought here for your inspection. The patient, a gentleman, presented himself to me about a year ago, with a fairly good-sized fissure in the soft palate, which had been acquired within a few weeks, and had rendered the articulation of sound so imperfect that it was almost impossible to understand anything he said. I had not seen the patient since, until Sunday

last, when he again presented himself. The fissure had closed, yet the articulation of sound has not been restored, and it is with great difficulty that the gentleman is able to converse.

I had no difficulty in diagnosing the case as one of syphilis, but I am free to confess that I am not conversant enough with such difficulties to determine where the defects are which cause the imperfect articulation. If it is your pleasure, Mr. President, I shall be glad to exhibit the patient, and the gentlemen may draw their own conclusions.

Dr. S. G. Perry.—In reference to Dr. Brockway's statement, I think the inference would be that he thinks galvanic action never occurs. I believe that it does not often occur, but I should hesitate about accepting the idea that it never occurs. I have seen a few instances of it caused by the contact of different metals in different teeth, but never, I think, from different metals in the same tooth. A connecting chain of fillings in the upper and lower jaw, I think, can sometimes, when of different metals, cause galvanic disturbance. In reference to this case shown by Dr. Van Woert, it seems remarkable that there should have been a spontaneous closing of the fissure. I think that Dr. Kingsley has always claimed that but little improvement is to be expected in such a case until the voice and speech of the patient have been educated. This gentleman will speak better, I think, when he has used certain methods of educating the voice; as yet he has not acquired the art of speaking with the mouth in that new condition. I am not, however, an authority on these subjects. It is a very curious and interesting case.

Dr. Brockway.—I did not mean to be understood as saying that galvanic action never occurred. As Artemus Ward used to say, it "rarely seldom" occurs. The point I wished to make was that even very intelligent patients get absurd notions into their heads, and it requires some conclusive proof to convince them that they have not a galvanic battery in their mouths, which is working to their serious injury. I know very well that galvanic action does occur from the contact of fillings of different metals, but the danger from it is vastly less than is usually supposed.

The President.—This case presented by Dr. Van Woert is certainly very interesting. I regret that Dr. Kingsley is not with us, for he is authority on these matters.

I see a number of new members present to-night, and I feel as though it were proper to say a few words to them. I congratulate you, gentlemen, and ourselves, upon your appearance with us, and hope you will continue to meet with us on all occasions. We ex-

tend the right hand of fellowship to you, and welcome you to our association, expecting you to take part with us in all duties and deliberations. We have need of you, as, in the order of nature, we, the older members, will pass away, and you are to take our places. It is fitting, then, that you should be preparing the way for your future responsibilities. There should be no falling off here; we look to the younger element to furnish the needed supply. We look to you to perpetuate our institutions and to give glory to our cause.

It will be well to cultivate, with us, the habit of speaking; no acquirement can be more valuable or useful, and we have among our members those who have no superiors in this respect. We do not know how many Miltons, Cromwells, or Washingtons may grace the future that shall have graduated from our association. You may regard this as a kind of school which may result to your advantage, as it has to many of us. We have in our midst artists and those who are *authority* in most of the departments of science; so, too, we can boast of having among our members some of the best parliamentarians of the day. Come prepared to speak, and, if you are not familiar with the subject, take notes beforehand. Remember there is a debt of gratitude we owe to the past that we can never repay. The world is entitled to our best thoughts, expressed in the best manner. Let your style be condensed, speak to the point, and briefly as compatible with your theme; do not wander from your subject, and thus increase the labors of the editor.

Come and join with us in pushing the car of progress onward.

Again we welcome you to our fraternity.

The President then introduced Dr. Heitzmann.

(For Dr. Heitzmann's paper, see page 341.)

The President.—Gentlemen, we have good reason to congratulate ourselves upon the privilege of listening to this very interesting address to-night, and the subject is now open for discussion. We had expected that Dr. Peirce, of Philadelphia, and Dr. Andrews, of Cambridge, would be with us, but they were prevented from coming. Dr. Atkinson is always with us, especially on an occasion like this. I hope this subject will be discussed at length to-night, for nothing can be more interesting. I will ask Dr. Atkinson to open the discussion.

Dr. Wm. H. Atkinson.—Mr. President and Brethren,—This is a subject that has engaged my earnest attention. By a sort of inspiration and a set of surroundings that were very favorable for investigating the formative changes in the elements of living organisms, I was engaged in their study at Cleveland, under the

guidance of the then best-known histologist of that State: I need only mention Hamilton L. Smith's name as an indication of the reverence that we bore the subject and the manner of its handling.

It would be a very interesting, instructive, satisfactory, and demonstrative work to recapitulate the processes through which we were carried by the inspiration of our work,—then as novices.

Out of this organization, this protoplasm, all functioning properties are produced, as has been clearly demonstrated to-night. My heart is overflowing with gratitude and thankfulness to the great Governor of the Universe, and also to Dr. Heitzmann as the exponent of the principle, and to him all who have a mission to correct pathological conditions owe a great debt.

I wish I could have the magic power to bring every mind in this room and every member in the dental profession exactly in the stand-point I occupy myself, in regard to the beautiful work that has been presented to us to-night by the apostle of that idea. You have all heard the definition he has given to-night so clearly of what constitutes a tissue, and as to the other moot questions, he said he would not enter into a mere polemical aspect of the subject. Where is there a higher mind than his who seeks truth for her own sake, in all the fields of investigation? I have said, probably to the disgust of many, so many times, that if men had a desire to learn equal to the desire they had to be considered by their fellows learned, that we would make very much more rapid progress, that would bring us in sight of the promised land,—to show us what organism really is,—at all events, arrive at antecedents so near that we call them such.

There are some who come over here, and, individually taking up a specific line of investigation, demand that every one should bow to it, not even allowing himself to show that he understood the first principles of organization, so as to have a stand-point whereby his own conscience might be satisfied when he said yea or nay to the subjects under examination, and if, by the mercy of Heaven, correct interpretation might be had, until such progress would seize the minds of men that we would no longer be in doubt about diagnosing a case. To whom do we owe that? To my blessed old Hungarian who said that the organization depended upon living matter; unfortunately, he did not tell us what living matter was, but he said he did not know. That is worth something. If a man has an inspiration to know something that he does not yet know, it is a blessed thing that he is under the conviction that is leading him in the right direction.

Function is not understood, and it will never be understood as long as we are under the damnable pall of former teachings.

Microbes have had a black eye given them to night by Professor Heitzmann, and I have serious doubts if there is a living example in the field of investigation that is better entitled to give us a classification than he, so that we will understand how to favor health, how to forestall disease, and thereby spread peace and good will throughout the whole realm of the sons and daughters of the Almighty, without rebuke of our own conscience, or the conscience of our fellows who are searching for the same truth we are so ardently laboring for.

Where is our difficulty? We have not yet sufficiently learned the processes through which we are carried by the grace of God in our mental work, so as to distinguish between the known and the unknown,—the unknown and the known, for we always begin with the unknown, and assume that we know it.

We have found an atom,—a thing that cannot be divided, but we never reach the truth of the hygienic movement, or a return to the health condition, by the administration of some agency which shall produce what we call the health, and what is called the disease, and what is called the remedy. Our difficulty is in assumption generally that we knew when we did not.

The doctor pronounces the fearful truth against us that for the last few years we have lost our inspiration in this work.

I wish we had the time, and you the patience, and I the inspiration, to go over that demonstration of karyokinesis, and that which has been explained to us to-night, and see that it has been acknowledged not only in the animal world, but in the vegetable world, and show that man who stands first in the discovery of protoplasm to-day,—who gave out what protoplasm was.

Dr. John I. Hart.—It is unnecessary, after the lucid manner in which Dr. Heitzmann has laid this matter before you, for me to corroborate what he has said; yet it is but just for me to do so, and to state that I have seen the reticulum which he has spoken of and demonstrated. At the same time, I do not think that the doctor should feel as discouraged as he seems to concerning the arguments that prevail against him, for intellectual advancement in all fields has met just such barriers as he is encountering to-day. Right through the history of development, arguments have been brought to bear against the theories that have been advanced, and in each instance, as the matter has been studied more thoroughly, admissions have been made by those who advanced the arguments against

the same. The offshoots from the dental pulp were first treated as a myth, but to-day are acknowledged, and I think it is only a question of a very short time when the interconnections between these dentinal fibres will be generally admitted, just the same as the original fibres.

Dr. J. Morgan Howe.—I am sure we are all very much obliged to Dr. Heitzmann for his clear and graphic descriptions, but I wish to call attention to one statement that he made, which seems to imply a misapprehension. In referring to the resolution that was passed by this Society, he said that the purpose of the resolution was to *compel* himself and others to submit their specimens to the examination of experts. If I am not mistaken, the language used was carefully amended, and the resolution passed was substantially that "Drs. Heitzmann, Bödecker, and Abbott be requested to cooperate with the Society in the selection of persons to whom they would be willing to submit specimens for examination." I call attention to it merely from the fact that Dr. Heitzmann used the word "*compel*." The Society certainly passed the resolution with the best intent and carefully avoided objectionable suggestions. It was in the kindest and most friendly spirit.

Dr. Atkinson.—I am very much pleased, and I thank Dr. Howe for the remarks he has just made. If there is any progress to be made anywhere it wants to be done in a friendly spirit, so as to avoid, if possible, any unpleasantness. It struck me, as it did Dr. Heitzmann, that it was an assumption of the exclusive ability to comprehend the thing, and that that ability resided either in the movers of the resolution or in those with whom they were cognizant. I am happy to see oil thrown on the waters, because polemical discussions have no business in scientific discussions, and it pains me to think we cannot live a good many lifetimes over to correct the mistakes we have made; and if I have anything to say to my beloved Carl Heitzmann, it is that he was always a little bit too ready to oppose the people who asserted themselves as opposed to what he saw, and I have justified him in that by reason of his greater opportunity and greater title to be regarded as competent to say that he is the best demonstrator of elementary structure of tissues, from the blood-corpuscle all the way up, that I have ever had occasion to come in contact with, and I hope that all discussions, or mere side-play, or individual preferment, to which I plead guilty, will be dropped. I always preferred those that sought the truth, and I thank him most heartily, and will give him a Delmonico dinner to show him I think so.

Dr. Perry.—I am exceedingly glad that the question of the resolution passed by the Society came up, and that Dr. Howe spoke of it as he did. I am sure there was a misapprehension, for it was certainly the desire of the Society to have a full and fair examination and discussion of the subject, and to do justice to Dr. Heitzmann.

While I am up I cannot help saying a word, though this subject is altogether too deep a well for me to draw water from; I may slip and fall in. In fact, it is too deep a subject for many men in any generation to undertake. It implies too much earnestness, and any one who will undertake it must devote a lifetime to it. Even if Professor Heitzmann is wrong in the theory that he holds, he has shown us by his clear statement what scientific studies will do as a school of training for the mind. It is only that training that will make men think correctly; and we ought to be ready to accept the thought of those who are so trained. There is a reasonableness about Dr. Heitzmann's theory which appeals to me very strongly.

Years ago, while studying in his laboratory, I remember distinctly that it seemed quite reasonable to consider a lump of protoplasm to be something like a bladder filled with water: compress it on one side, and it bulges out on another. Watch its movements, and one cannot help feeling that there is a boundary to it. As it contracts on one side, and the living matter becomes more concentrated, it must become thinner on the other side.

The conditions in this country are not favorable for original investigations, as Dr. Heitzmann said. I am afraid they never will be. We work too hard; life is too exacting. This is the kind of work that can never be done except by those who have the scientific spirit, and who have time at their command. I think that if Professor Miller had remained in America he would never have been the scientific investigator that he is. Professor Heitzmann, to a certain extent, takes to task his countrymen on the other side, but I think a great deal is due to them for their willingness to work so patiently for final results. We see in him a shining example of the German school.

Dr. Remington.—I move a vote of thanks to Dr. Heitzmann for his instructive lecture.

Motion carried.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,
Editor New York Odontological Society.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE American Academy of Dental Science held its regular monthly meeting at the Boston Medical Library Association Rooms on February 4, 1891.

President Seabury in the chair.

The paper of the evening was by E. G. Tucker, M.D.; subject, "The Organization and Diseases of the Teeth." (For Dr. Tucker's paper, see p. 379.)

DISCUSSION.

Dr. Fillebrown.—I was sitting so directly behind the speaker that I did not hear the first of the paper with sufficient clearness to be able to discuss it. I wish, however, to express my general agreement with the paper, and my pleasure in listening to the dissertation of a person of Dr. Tucker's age and experience. I wish to thank him for giving us the benefit of his thoughts to-night.

President Seabury.—There is one point in the paper that struck me very forcibly. We used to call decay of the teeth a vito-chemical action. Dr. Tucker has set forth very clearly that chemical action ceases when the vital action ceases; that is, that a dead tooth never decays when out of the mouth. It had not occurred to me before in that light. It is necessary to have life in order to have decay.

Dr. Meriam.—The rotting which the doctor speaks of is an important matter, and seems to be confined entirely to substances which go on rotting when separated from their vital connections. For instance, we find that an apple rots after its removal from the bough. The experience of the past few years has developed very clearly the medical relation of the operation of filling teeth. The change in the medical practice of to-day means an added importance to dentistry. There was a time when in nearly all diseases a low diet was prescribed. To-day, even in fevers, a patient is fed and given all the nutrition he can possibly care for. This is to prevent, as far as possible, a person coming out of a sickness in a debilitated condition. A short time ago a very learned physician said to me, referring to our specialty, "A man who fixes another so that he can eat does a great service." Medically speaking, that describes the physiological office of the dentist. "He fixes a man so that he can eat." I did not come prepared to speak, but I felt it was my place to come when Dr. Tucker was to read a paper. When he does us

that honor, there is an opportunity to show the pride which some of the younger men have in him.

Dr. Mead.—I was saying to Dr. Tucker before the commencement of the meeting that nothing would have drawn me forty miles to-day only to hear his paper. I have known Dr. Tucker since my boyhood, as a man and as a scientific operator, and it affords me great pleasure always to meet him on these occasions, but more particularly now when, at his advanced years and with his great experience, he is equipped with those attributes which inspire every man to do good work. I am very happy to have been here this evening, and should not have come if it had not been for the pleasure of hearing him.

President Seabury.—The next thing in order will be "Incidents of Office Practice and Presentation of Specimens."

President Seabury.—I will mention a fact that was brought to my notice to-day,—that is, it is supposed to be a fact,—that aluminum foil is practical as a filling-material. It is said that it can be beaten out as thin as gold and that it is soft and pliable and will pack into a tooth as well as gold. It interested me very much and I took measures to find out more about it.

Dr. Williams.—I hope the president will ascertain where it can be found.

President Seabury.—I shall. It is a remarkable metal; it is not corroded by the oxygen of the atmosphere any more than gold is, and has other valuable qualities which make it available for our use.

Dr. Fillebrown.—The first aluminum manufactured for dental purposes was said to fail in the mouth on account of its not being pure. It is now being made quite pure.

Dr. Meriam.—I think there would be no difficulty in having any gold-beater make a foil, if a sufficient number of dentists would take it. The purer metals are, the easier they are worked. Dr. Carroll, a maker, who was on here with a furnace, produces aluminum foil, and I think I have a sample of it now which he passed around in New York. It is a soft foil to be used in cylinders. I have not attempted to use it, but think there is no cohesion, and should question whether it would be as practicable as gold.

Dr. Williams.—Some time ago I tried to mix aluminum with mercury, but they would not combine. Perhaps it was due to the impurity of the first preparations of aluminum, though I doubt it. I have not tried the experiment of late.

Dr. Edly.—I wish to show a convenient method of having bill-heads. They are blocked and have stubs after the style of check-

books. By having them in this shape they are always ready instead of being scattered in different drawers of your desk.

Dr. Taft.—I should like to ask Dr. Eddy how he itemizes a bill in case he is requested to do so by the patient?

Dr. Eddy.—I send them a diagram of the mouth, specifying on that the work done. The majority of them don't know a lateral from a molar, but by sending a chart they will know where the work was done. I don't suppose there are more than one or two a quarter who ask for an itemized account.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

NEW JERSEY STATE DENTAL SOCIETY.—TWENTIETH ANNUAL SESSION.

(Continued from page 255.)

DISCUSSION ON DR. R. C. NEWTON'S PAPER.

(For Dr. Newton's paper, see page 353.)

Dr. B. F. Luckey.—Mr. President and Gentlemen,—When I read on the programme that I was to open the discussion on this paper I was astonished, not having been forewarned and not having had an opportunity to read the paper since.

I do not think it would have made any difference if I had had opportunity to do so, for I do not see, upon listening to it, that there is anything in it that is open to discussion to any extent. As a dental paper from a medical source it is one worthy of commendation. As a general thing, such papers coming from medical sources are very apt to be loaded and surcharged with ideas that are fallacious. As a rule, medical men give so little attention and thought to dental subjects that when they do consider them they do so a good deal in the manner of the laity. The doctor has dealt to-day with the subject of "The Physiology and Hygiene of the Second Dentition," and it is a compilation of well-known facts that have been gathered apparently from reliable sources. But, so far as I remember, none of his remarks bring out anything entirely new, and he reduces the work of a dentist down to the use of a lancet. Almost all of the troubles he mentioned occur through retarded dentition, or irritation from retarded dentition. I think, perhaps, I can do nothing more interesting than to cite a case which has just

recently passed through my hands to illustrate that if physicians were a little more conscientious in consulting with their brotherhood, the dental profession, they would not only confer a boon upon their patients, but also relieve themselves of a good deal of the odium which attaches to the mistakes which all professional men are liable to make.

A patient, probably thirty years of age, presented a very badly-swollen jaw. The swelling was of such a nature that the patient was unable to open his jaws sufficiently to permit of a proper examination of the whole of the mouth. He had been under the treatment of a physician for nearly three weeks, and was nearly exhausted from pain, suffering, etc. His physician told him there was dead bone back of it, that there was necrosis, and he would have to operate to relieve him. He came to see me about it. I could not with the little chance I had for exploration determine satisfactorily to my own mind what the trouble was, but I came almost positively to the conclusion that it was due to a wisdom tooth coming through in such a direction that it was not possible for it to get into position: it was tilted over in the ramus of the jaw and came directly against the distal surface of the second molar tooth. I informed the gentleman that, as far as I could judge, that was his trouble, that if he would open this abscess and allow it to discharge, and come and see me as soon as he could open his mouth properly, I might be able to help him. The abscess was opened and discharged freely, but the hard swelling did not subside, and the man was not able to open his mouth for two or three days. He suffered a great deal, and I advised him again and urged him not to poultice from the outside, his physician constantly recommending that process. I explained to him it would not relieve him, but the probability was he would have a scar on the outside of his face as long as he lived. I informed him after the second visit that I was sure there was no necrosis, and our only hope was to extract the second molar, which was perfectly sound, and allow the wisdom tooth to come in in that way. He did not feel willing to agree to that, and of course we could not perform any operation until his jaws could be opened. He came to me the second time some weeks after and I gave him the same advice, but he did not feel inclined to accept it; he said he would come when he could open his mouth; in the mean time he went back to his physician and made an appointment; they anæsthetized him, opened his face, went for the dead bone, and did not find it. The man recovered after awhile sufficiently to open his mouth and came to see me again; by that time the

wisdom tooth had begun to show itself slightly, and I was satisfied thoroughly then of the diagnosis, and again advised him to submit to the operation; he did so and recovered entirely; but he has two horrible scars on the outside of his face which he will carry to his grave. There was a case of suffering for some two months or more, which could have been cured at the start, in all probability, had there been a consultation between the physician and the dentist.

As to the hygienic portion of the paper, I do not see that I can add anything to what the doctor has said as to the care and nutrition of the patient, excepting to advocate the constant and thorough use of the teeth and their cleansing. The teeth, like all other organs of the body, require use to get them in their proper condition. The selection of soft food and the avoidance of the use of the teeth creates a tendency, as similar causes do in all other organs, to degeneration, and although abrasion may be somewhat wearing on them, it still has a tendency to the hardening of the teeth.

Professor C. N. Peirce.—I speak because I wish to congratulate the New Jersey Society on having a physician read a paper before it, and I want to congratulate the author of the paper on the arrangement of his subject and his treatment of it, because I believe it is a very great step in advance of a large class of medical practitioners. The reading of the paper has given me a good deal of pleasure, and although perhaps he has not illustrated anything but what many of our leading dentists have been familiar with for years, yet it shows that the medical profession are recognizing the influence of the teeth in certain directions. It also adds greatly to the status of the dental profession in the eyes of the medical profession when it is recognized that the teeth themselves are capable of producing such systemic disturbances. I could make no criticism at all of the paper excepting as to a remark that the character of the first molars and the influence of dentition was quite as great in the development of a child through youth and to manhood or womanhood as hereditary influences are. While I recognize the influence of dentition very fully, yet I want to say that hereditary conditions are in advance of the results accomplished by individuals. There may be temporary influences during the period of dentition that will effect the development of the teeth in an infant, and will necessarily cause great disturbances in the eruption of the permanent teeth. As the doctor is well aware, when a child is born it has the twenty deciduous teeth largely calcified; those teeth are influenced by the action of the health of the mother during the period of gestation. During the first year of life we have the incisors and

first molars undergoing calcification. The first molars at birth often have the point of the cusps already completed. The health of the mother must necessarily produce imperfect development in those first molars if it is bad, and unless that child has peculiar influences about it during the first two years of its life all the permanent teeth will be imperfectly calcified and oftentimes produce great disturbance in their eruption in consequence of the imperfect nourishment of the infant.

Otherwise, I have to say amen to every word of the paper, with just that little criticism.

Dr. J. A. Osmun.—I have nothing to add excepting words of commendation for the paper, and as I am delighted with it I can only re-echo the sentiment of Dr. Peirce,—that dentists and physicians are becoming brothers in a common cause, and the time is coming, I hope, when they will stand shoulder to shoulder in their efforts to relieve the sufferings of their patients. It should be so.

The doctor's paper points out in a broad way the influences that come from first and second dentition. From a physician's standpoint he deals with the body as an entirety, but he also feels that he should have the benefit of consultation with his brethren who make a study of this particular portion of the body. I say it is a happy omen of the time when we shall stand shoulder to shoulder in our efforts to alleviate pain.

Professor Charles Mayr.—Professor Peirce's remarks have suggested to me a most interesting subject, namely, the question of how the various cells in the child during the period of gestation are connected with the corresponding cells in the mother. You know there are two theories, one is that from every tooth in the mother's mouth there goes a nerve-filament to the growing tooth of the child, and I think the observation is not uncommon that women about that time feel various organs getting out of order; first the stomach is wrong, and this is wrong and the other is wrong, and then the teeth are wrong. I think that is the first shock of the connection, and afterwards it is normal. We can remember our experiences when we were first thrown in the water to learn to swim; we remember it all our life long, but afterwards we tumble in a dozen times and forget all about our sensations, so that I think the moment a woman in that condition feels her teeth aching the connection is made and the teeth begin to calcify, and the child too has to get its starting-point from the lime salts of its mother's teeth.

I believe myself too much in the individuality of atoms; in my

opinion there are no two atoms exactly alike, every atom has its individuality.

The other theory is that no such connection exists, but an impulse of wave motion proceeds from the teeth of the mother towards the child. Which of the two theories is correct is hard to tell.

Dr. Sanger.—Suppose the mother's teeth are false, what then?

Professor Mayr.—Well, of course the nerves of the teeth are still there, the teeth and the endings and all that; the nerve-endings which formed the teeth before are still there unless the whole tooth and nerve is destroyed.

Dr. Walker.—Does Professor Mayr think that the lime-salts are gradually absorbed from the bony system of the mother and pass through the circulation to the child?

Professor Mayr.—As I said, there are two theories, one being that only the wave motion is transmitted, and the other that entire particles from the part are transmitted down to the corresponding part in the child.

Professor Peirce.—There are a great many mothers who bear children without any detriment to the teeth. The mouth is kept in a perfectly healthy condition all through the period of gestation, and not only one, but sometimes ten or twelve children are borne, and the teeth are always in good condition. On the other hand, we find mothers who become exhausted and are not able to produce sufficient nutrition to build up the embryo, and so the deficiency arises through the inefficiency of the mother.

I know of an instance where, in the case of an infant, the original teeth were entirely deficient of enamel. The permanent teeth came through in no better condition, and the difficulty was that the mother had just that trouble during the period of gestation. The child never had good teeth because, during the period of gestation, there was no ability to build up those structures.

Dr. R. C. Newton.—Our indiscretions sometimes serve us well. I think I read that line concerning hereditary wrong, but it drew forth a very interesting talk from Professor Peirce. I think it all goes to show the main contention of the paper is right,—that an immense amount of good can be done if you treat those matters intelligently and at the right time. Nine times out of ten it seems to me the constitution is good enough if the people having the care of children knew what was needed. Doctors have not given enough attention to the teeth; they do not care enough about it. Until within a few years they were brought up to consider the body as a receptacle for drugs which should remedy existing evil. The

whole tendency of modern thought is to prevent the evil rather than to go upon the idea that for all troubles there is a remedy. As Professor Mayr has said, when we are able to restore decay we shall have discovered the elixir of life. None of us believe we shall ever find the elixir of life, but a little elixir of common sense in the bringing up of children would be a very good thing.

Dr. J. A. Osmun.—That is the idea I tried to bring out yesterday. The public ought to be better educated, and the province of dental and medical societies is to disseminate more knowledge among the laity.

Dr. Newton.—That is the view I have always taken, and for that reason I have always been willing to do all I could in that direction.

On motion, the paper of Dr. Newton was passed.

Adjourned until 8 P.M.

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

(For Dr. Leffmann's paper, see page 383.)

Dr. L. Ashley Faught.—Mr. President and Gentlemen,—I have listened with the deepest interest to the reading of this admirable paper. The time of its presentation seems to me to be most opportune. The subject of dental education has earnestly engaged the attention of the profession at different periods during the last twenty years. And each new outlook seems to have been taken at the beginning of each decade.

I conceive that our highest good lies not in developing either the mental or the mechanical at the expense of the other, but in a wise and judicious blending of the two. While it is true that ours is a surgico-artistic profession, and that mechanical operation constitutes the largest part of our duties, that we are engaged more with the mechanical than with the medical, more with the prosthetic than with the therapeutic, yet the coming dentist will practise as an adviser as well as an operator, and must be a scientific man. What he should seek to do is to blend the science with the practical, but this practical education cannot be taught, it can only be acquired.

There are, however, concomitant evils connected with dental education which, from our stand-point outside the rank of teachers, demand indication.

We want and must have, at the present time, less rivalry between our institutions of learning. The effort should not be for

popularity, or to rank as the best; but the aim should be the same in all,—to help one another preserve the honor of the degree, and to properly prepare material for the dental ranks. The list of matriculates will bear large pruning, for many are admitted who show a most unhealthy tone at the very start by inquiring “how to get a degree with the least expenditure of time and money.”

I believe, too, that a more healthy tone could be imparted to dental colleges if their boards of trustees were composed of their own local alumni. Operating in somewhat similar manner, much can be expected from the work of those State boards of registration and examination in dentistry, which may be in the future created to exist under such State dental laws as the New Jersey Society succeeded in having passed in April of this year.

Dr. Gerhart.—In the final examinations, deficiencies in one department should not be condoned because the candidate for graduation manifests proficiency in other departments.

The matriculate should have not only a good English education, but should also have some knowledge of Latin and Greek, because upon these technical terms are based.

DISCUSSION OF DR. LIBBEY'S PAPER ON “IMMEDIATE ROOT-FILLING.”

(For Dr. Libbey's paper, see page 388.)

Dr. Roberts desired to know what becomes of the chlora-percha forced through the apical foramen.

Dr. Libbey, replying, quoted Dr. Jennings, of Cleveland, Ohio, as authority for the statement that the chlora-percha becomes encysted. He does not think it is absorbed by the circulation.

Dr. Roberts asked further for information as to whether Dr. Libbey placed entire dependence for antisepticism upon the chlora-percha, or whether its injection is preceded by the application of a disinfectant.

Dr. Libbey stated that the paper explains that in its reference to the use of permanganate of potassium, alcohol, hot air, and wood creosote. He thought these were sufficiently disinfectant.

Dr. Ward said that in his experience the principal difficulty met with in the treatment of these cases exists in the fact that patients cannot always be relied upon to obey directions, and to keep appointments when roots are not filled immediately. They want immediate relief when a tooth aches, and when the pain is allayed they neglect attending to it afterwards unless pain recurs. He has found oxide of zinc valuable as an agent in the immediate filling of roots.

Editorial.

THE CONVENTIONS.

THE season for the gathering of the various conventions both in this country and Europe is approaching, and it is important that those interested should arrange to make these worthy the profession they represent. To do this means a wider and deeper interest than has heretofore been manifested both by those who have been active in their development as well as others who usually let them pass by without a thought.

The professional spirit in dentistry needs cultivating, indeed, it may be questioned whether beyond a small circle it has any existence. From that limited number has come the earnest workers who yearly sacrifice time, money, and strength that dentistry may have a living organization to represent its thought and activity.

The lack of interest in the work of the profession in its literature, its meetings, and the innumerable details necessary to progress, has been a serious hinderance to its advancement. The meetings come and go, and the individual members are found either at home, over the chair, or seeking enjoyment and recreation elsewhere, indifferent to the sacrifices being made for their good and that of the entire body.

This indifference is not wholly based on selfish considerations. With many it has had its origin in the organizations and their management. The time was when these national gatherings were looked forward to with an ever-increasing interest. They were regarded as the exponents of the best thought and represented the highest ideals in theory and practice; but in time they have almost ceased to have a controlling influence, and it has come to be regarded by many as a matter of no importance whether the American Dental Association meets or not, as it has ceased to have any power for good or ill to this class or, in their opinion, to the profession at large. If this idea be the true one, and it is feared it cannot be controverted, it is time that the active workers in these various bodies were asking themselves the question, What is the cause and the remedy? This is more easily asked than answered.

The primary consideration is to bring about a union of effort. At the present time there are three national organizations,—the

American Dental Association, the Southern Dental Association, and the Section of Oral and Dental Surgery of the American Medical Association. At the present writing the latter is in session at Washington, D. C. As membership here is confined to those having the degree of Doctor of Medicine, it naturally follows that this must be limited. The American Dental Association is arranged in two classes,—permanent members and delegates. The Southern Dental Association is, we believe, modelled after the same plan.

It is, perhaps, idle to expect the section of the American Medical Association to abandon their exclusive organization, nor is it probable that either of the other two will change their mode of procedure. Yet it is apparent that unless a better system be adopted, the present mode of meeting together will fail eventually from its own dead weight.

It is not the time or place to enter into the consideration of proposed changes. These will come; but only by the influence of a more progressive life in the various bodies. This desirable state can, in our judgment, be best attained by each of the local society organizations sending up a vigorous intelligent body of men as delegates, with instructions and determination to make the American Dental Association at least a representative body, and so change the constitution that the "permanent-membership" clause may be cast into deserved oblivion. This should never have been engrafted on a society that aims to exercise a controlling influence over the polity of the general body. It has figuratively been the millstone around the neck of the Association for years.

Delegates have been sent to represent local societies, and have found that instead of a deserved welcome they have metaphorically been shown the door. It is not pleasant to be informed that as delegates no privileges can be extended, no membership in sections can be permitted, no place among the offices is open, nothing is given but the privilege of paying five dollars and the right to speak upon the subjects under consideration.

It is time that a broader view should be taken than has heretofore prevailed. The effort, which occurs almost annually, to crush expression on the floor from those not members, or who may be considered such, should receive the condemnation of all liberal-thinking men. If a rule be necessary to meet disorder, let it be elastic, so that those who meet there for scientific progress may not be subjected to the unpleasant scenes so often witnessed, and brought about by those who make rules of order paramount to the main purpose of the meeting.

A representative organization, the outgrowth of properly-arranged local societies, is what is most needed at the present time. The best organized State, as far as the writer is aware, is New York, and the system of district associations has given a vigor and impetus to professional work there not equalled in any other State of the Union. Something of a similiar character is needed for the United States at large.

Let every man who can secure the proper credentials go to Saratoga. The expense of living there is not greater than elsewhere if the large hotels be avoided, and, with this difficulty overcome, there is no pleasanter place in the United States for a week's sojourn, or one more healthful.

The organizations which follow the American Dental Association as a matter of convenience—the National Association of Dental Faculties and the National Board of Dental Examiners—will be there; at least, the former has so announced, and it is presumed the latter will find it most satisfactory to do so. It is to be hoped that the National Board will approach the work of this year with a closer circumspection of their proceedings than was manifested at Excelsior Springs. They have a delicate work to do, and to accomplish it without undue friction requires tact of the highest order.

Those who contemplate going abroad should remember that the American Dental Society of Europe meets this year at Heidelberg, on the Neckar, August 3, 4, and 5. The reunion, in such surroundings, it may safely be promised, will be a delightful one.

THE UNITED STATES SUPREME COURT DECISION IN "TOOTH CROWNS."

THIS decision was rendered April 27 in the case of Dr. Edward S. Gaylord, of New Haven, Conn., and in opposition to the claims of the Tooth Crown Company.

It will be remembered that in 1887 a suit was brought against Dr. Gaylord in the United States Circuit Court in New Haven. The judges decided the patent invalid. The case was then appealed to the Supreme Court. It reached an argument some weeks ago, the justices finally reaffirming the decision of the Circuit Court.

This conclusion will be regarded with satisfaction by the profession. Much is due to Dr. Gaylord for his long and persistent fight, and it would seem proper that this great service should receive recognition in a form worthy the man and the work.

DR. JAMES W. WHITE.

WE are only able to announce the death of Dr. White in this number. It took place at his residence in this city (Philadelphia) on the morning of the 27th, from an apoplectic attack. He was actively engaged in his office up to a late hour the evening previous. A full account of his life-work will appear in the next number.

DR. EDWARD MAYNARD.

THE death of Dr. Maynard, noticed in full in another part of this journal, is an event in dentistry. The present generation of workers, it is to be presumed, have only a traditional idea of his labor and of the position he once occupied. To those, however, who were contemporary with him, or as young men of the past who reverently spoke his name, his death recalls one of the most interesting periods in the building up of the profession.

To Dr. Maynard belongs the credit of dividing the old dentistry from the present, in fact it may be said that he made the dentistry of to-day possible by the introduction of his mode of filling root-canals. This he did, and so thoroughly and so skilfully was this performed that the results carried conviction to the minds of the best workers everywhere.

When it is remembered that prior to this the salvation of teeth with exposed pulps was an impossibility save in exceptional cases, that little was known of the pathological complications liable to ensue, it is not surprising that Dr. Maynard's work opened up possibilities more important in their far-reaching effects than anything that followed, not even excepting the introduction of cohesive gold. It has long been the teaching of the writer that the operation of canal-fillings was the beginning of modern dentistry, that all that preceded it was in degree empirical, and that all that has since followed has more and more approached a truly scientific basis.

Dr. Maynard was a many-sided man. He was in a measure lost to dentistry by other and, to him, more important work, but the fact that he did so much should cause his name to be honored as one who made dentistry worthy its present position.

Dr. Maynard may have built better than he knew. Before the period of antisepsis so effectually did he do his work that to-day we cannot do any better, and in the skilful handling of material for

filling canals there is nothing done at present as Maynard, Townsend, and the few did it, and it may be questioned whether, even with the aid of antiseptics, the result is any more satisfactory.

The fathers are falling by the way. Let us each and all treasure their work, be inspired by their devotion to the highest good irrespective of personal considerations, and so make the memory of their valuable productions the touch-stone of our own aspirations, our own ambitions.

Domestic Correspondence.

TO THE EDITOR :

At the annual meeting of the Chicago Dental Society, held Tuesday evening, April 7, 1891, the following officers were elected for the ensuing year :

D. M. Cattell, President ; J. W. Wassall, First Vice-President ; E. M. S. Fernandez, Second Vice-President ; L. L. Davis, Recording Secretary ; T. L. Gilmer, Corresponding Secretary ; E. D. Swain, Treasurer ; A. W. Harlan, Librarian.

Executive Committee.—J. A. Dunn, G. H. Cushing, E. Noyes.

Board of Censors.—B. S. Palmer, G. J. Dennis, R. M. C. Paine.

THOMAS L. GILMER,

Corresponding Secretary.

April 9, 1891.

TO THE EDITOR :

The commencement exercises of the University Dental College, Department of the Northwestern University of Chicago, were held in connection with the Medical Department, Chicago Medical College, at Central Music Hall, on April 28, at 2.30 P.M.

The degrees were conferred upon the graduating classes by President Henry Wade Rogers, LL.D., and the doctorate address was delivered by Professor N. S. Davis, Sr., dean of the Medical Faculty.

The following is the list of the dental graduates :

Ellsworth Goldthorp, Iowa ; William Edward Harper, Illinois ; Alexander Clarence Murchison, Illinois ; William B. Winget, Illinois.

JOHN S. MARSHALL,

Dean.

CHICAGO, ILL., April 30, 1891.

Obituary.

DR. EDWARD MAYNARD.

DR. EDWARD MAYNARD died May 4, 1891, after a long and painful illness. He was born in Madison, N. Y., April 26, 1813, and consequently was aged seventy-eight years at the time of his death. Dr. Maynard was twice married. By the first marriage, with Miss Ellen Sophia Doty, of Sherburne, N. Y., he had six children, all of whom are living,—Mr. George W. Maynard, New York; Dr. John D. Maynard, dentist, New York; Mrs. J. L. Hatch; Mrs. D. J. Hatch, of Rochester; and the Misses Marie and Virginia Maynard, of Washington, D. C.

The second marriage was to Miss Nellie Long, of Savannah, Ga. She, with the only child of this union, Mrs. Edwin Q. Laselle, of Troy, N. Y., survive him.

Dr. Maynard was prepared at Hamilton Academy for the Military Academy at West Point, entering that institution in 1831. The drill duty there being too exacting for his always delicate health, he resigned in the same year, and gave his attention to civil engineering, the study of anatomy, architecture, drawing, and such mechanical employment as would best educate his hands for the profession he finally adopted in 1835. He settled in Washington, D. C., in the following year, and continued to practise there, with short intervals, up to March, 1890. His inventions in instruments and modes of using them in his profession have been numerous, and many of them have become well known and generally adopted. His discovery of the very great diversity of situation, form, and capacity of the maxillary antra was made known to the Faculty of the Baltimore College of Dental Surgery in 1846, and was officially acknowledged. It has from that time been regarded as of great importance in the treatment of disease of the superior maxillaries.

His announcement of the existence of dental fibrils, based upon his discovery that sensitive dentine could be cut with less pain in particular directions than in opposite ones, was discussed, and the discussion was reported in the *Transactions* of the American Society of Dental Surgeons before any announcement of the discovery of such fibrils by the aid of the microscope.

So far as now known he was the first to successfully practise (in 1838) the thorough filling, with gold-foil, of the nerve-cavity, including the nerve-canals, in molar and bicuspid teeth, an operation he introduced in Europe in 1845. At St. Petersburg, the emperor's physician, Dr. Arndt, having witnessed this operation, Dr. Maynard was immediately employed in the imperial family as court dentist.

The emperor (Nicolas I.) offered to create the title of "Actual Dentist to His Imperial Majesty," with the rank of major, and give him this if he would remain in Russia for ten years and practise and teach his ways of practice; Dr. Maynard to be attached to the court with a salary or have a private practice as he might elect. This offer was declined. Accompanying the sum paid for his services was a magnificent diamond ring, sent as a token of appreciation.

In 1857 he accepted the chair of Theory and Practice in the Baltimore College of Dental Surgery (the first dental college ever established), and held the like position in the Faculty of the Dental Department of the National University at Washington. His practice has been mainly among the higher classes, including several Presidents, a great number of Cabinet officers, senators, representatives, officers of the army and navy, foreign ministers, and others, who demand such dental operations as necessarily exclude all machine-work.

He has received the honorary degrees of A.M., M.D., and D.D.S., is an honorary member of the American Academy of Dental Science of the European Society of American Dentists, member of International Medical Congress, September, 1887, etc.

In 1845 (March 3) Dr. Maynard patented a system of priming for fire-arms, to take the place of the percussion-cap. Coiled and protected in a recess of the lock was a water-proof, incombustible, tape-like paper strip, having on one side fifty lozenge-like elevations at equal distances apart.

Each elevation contained a charge of fulminate. When the hammer was cocked, one charge was automatically projected over the nipple. When the hammer descended, it cut off and fired the charge. The United States government bought the right to use this invention, and, after many years of delay, applied it to about thirty thousand rifles and muskets. It was honored abroad also, the King of Belgium complimenting the inventor in person as the "author of such a beautiful invention," and offering to apply it on trial to the muskets of a regiment of his soldiers, the King of

Prussia making him a chevalier of the Military Order of the Red Page, and the King of Sweden giving him the great medal of merit,—an honor rarely given to a foreigner.

In 1851 (May 27, 1859, December 6, second patent) he patented a breech-loading rifle, known now throughout and beyond the limits of civilization as the Maynard rifle. His later improvements on the mechanism of this arm (those patented in 1859) adapted the arm to the use of his invention in metallic ammunition (patented 1856, June 17), in which a truncated cylindro-conoidal projectile is tightly set in a cylindrical metallic cartridge, having and holding firmly the axis of the projectile in the axis of the cartridge: thus, in the act of loading a gun, placing the axis of the projectile precisely in the line of the axis of the bore of the gun and holding it in that line until it, in the act of firing, has fully entered the bore. As the use of this kind of ammunition resulted in great increase in precision, and on frontier trial proved its ability to withstand all the casualties of rough service, it eventually came to be adopted by the United States government, by all American manufacturers of breech-loading arms, and is now in use by nearly all nations for their military rifles, and by nearly all riflemen in all countries.

In 1860 (October 30) he patented a method of converting muzzle-loading arms into breech-loaders. The Secretary of War ordered the two master armorers, Allin, of Springfield Armory, and Ball, of Harper's Ferry Armory, to examine and report at Washington upon this invention. They made a detailed estimate of the cost of converting muskets and of making new ones on this system, and reported that they had tried it and found it safe, strong, and durable. The principal claim in this patent is on a device, then first applied, of relieving the hinge of the recoil-block from strain by compelling all the rearward pressure to come against the breech-pin or other solid rear end of the barrel. Under various modifications of form and position this particular feature has come into extensive use in military arms in the United States and other countries.

In 1868 (October 20) he patented the joining together of two rifle or shot barrels by a device that would allow either barrel to expand or contract endwise, independently of the other. This proved especially valuable in double rifles, inasmuch as by the old method of joining the barrels immovably, either barrel may be so heated by a single shot, or by having the sun shine on it while the other is in shade, that it will become measurably longer than the one not so heated, resulting in both barrels being made crooked and kept so until the heat is equalized by convection.

In 1886 (June 8) he patented an invention for indicating the number of cartridges in the magazine of a repeating fire-arm at any time. A disk of metal, say a quarter of an inch thick and of the diameter of the magazine, forms the front end of it. This disk has figures plainly marked on its circumference from 0 to the full number the magazine can contain. It is connected with the magazine spring, which revolves in one direction as cartridges are put into the magazine and in the opposite direction when they are pushed out. The value of the invention is readily appreciated by military officers, to whom it is of prime importance that they should be able to tell at a glance to what extent, if at all, the magazine is supplied before going into action, and by hunters for a similar reason.

Many other patents were granted to Dr. Maynard, many of them subsidiary, on fire-arms and ammunition. None of these are deemed to be of sufficient note by themselves for mention herein.

PROFESSOR JOSEPH LEIDY.

THIS distinguished scientist passed from active life April 30, 1891.

He had not been in good health for some time, yet he continued his work up to within a few days before his death. He had completed the examinations at the Departments of Medicine and Dentistry of the University only a few days before his final sickness. He was not able to sign the diplomas, thus literally dying in full harness.

He had stood for many years as the leading scientist in this country. His attainments were as varied as they were profound, and it came to be understood that the last resort in the solving of difficult problems was Professor Leidy.

He was born in Philadelphia sixty-eight years ago, and very early entered into the study of mineralogy and botany. He graduated in medicine at the University of Pennsylvania in 1844. He subsequently assisted Professor Hare in his chemical laboratory. For a time during the war he served as surgeon at the Satterlee General Hospital in Philadelphia. In 1846 he was made demonstrator of anatomy of Franklin Medical College, and later made a tour of Europe. In 1853 he was appointed to the chair of Anatomy

in the University of Pennsylvania, and in 1871 was elected to the chair of Natural History in Swarthmore College.

The amount of work done by Professor Leidy is too extensive to be even mentioned here. His contributions were constant as his work was untiring. He was recognized all over the world, and made a member of the leading scientific societies in almost all countries. His work for the United States government was extensive: that on the "Fresh Water Rhizopods of North America" will carry his name in scientific history as one of his most remarkable productions.

He was a fine draughtsman, and was thus enabled to illustrate his work and his lectures in the most satisfactory manner.

Those who knew Dr. Leidy intimately appreciated most fully his kindly nature, ever eager to impart information, but at the same time free of egoism than any man the writer ever knew.

He was Professor of Anatomy in the Department of Dentistry, University of Pennsylvania, from the date of its organization. The many students, the world over, who have benefited by his thorough teaching will mourn his loss not only as a teacher but as the ever-kindly adviser.

Professor Leidy was president of the "Anthropometric Society," the main object of which is the minute examination of the brain. It is singular that Dr. Leidy and his brother, who died the day previous, furnished the material for the first examination.

They were both cremated Tuesday, May 5, 1891.

W. H. ATKINSON, M.D., D.D.S.

SPACE did not permit an extended notice of Dr. Atkinson's life-work in the May issue of this journal, nor had we the full data necessary. This has since been received through the kindly efforts of several friends, to whom our thanks are due.

Dr. Atkinson was born January 23, 1815. His father was a Methodist minister and his mother was of Quaker origin. She was the doctress of the neighborhood in Mercer County, then very sparsely settled. This gave the subject of this sketch a natural inclination towards medicine, although at an early age he was apprenticed to a tailor, filling up spare time with farm-work.

He early exhibited a desire to investigate scientific problems, and at a later period he went to Meadville, Pa., to study medicine with Dr. William Woodruff, whose daughter, Martha C., became his

wife May 17, 1840. He graduated as an M.D. at Willoughby University, Willoughby, Ohio, in 1847, his thesis being upon "Sleep." This college was subsequently burned with its records, so that this early effort cannot be compared with his later work.

He began the practice of medicine and especially surgery at Meadville, in partnership with his preceptor, his father-in-law. He removed from here to Norwalk, Ohio, where he practised as a surgeon and physician. While very successful in these related branches he saw a wide field opening in dentistry, then in its infancy, and again changed his residence to Cleveland, Ohio, in 1853, where he entered into partnership with Dr. Slawson. At this time he took Dr. Charles R. Butler as student, and subsequently formed a partnership with him.

He received the dental degree at the Ohio College of Dental Surgery at Cincinnati, 1859, and removed to New York in 1861, where for a year he managed the S. S. White Dental Depot.

Dr. C. R. Butler writes of him in connection with his Cleveland experience: "Dr. Atkinson conceived that dentistry must be far more than a trade, and from that time he strove to make it a great and ennobling profession. He came to Cleveland full of vigor and enthusiasm, and soon became known as one of the most aggressive and progressive members of the dental profession. He was not one to be led, nor was he satisfied with an inferior rank. He was an earnest student in microscopy, in fact all natural sciences claimed his attention. His professional life here was a gratifying success. He was one of the very first to advocate a higher fee for dental operations. When he came to Cleveland professional remuneration was at a low standard. This he soon changed for his own good and that of his brother dentists."

He opened an office in New York in 1861, in the house of Dr. William H. Allan, 18 West Eleventh Street. The following year he moved to 41 East Ninth Street, where he remained.

He founded the First District Dental Society, and devoted a large portion of his time to advance the status of dentistry.

He was the first president of the American Dental Association, and was instrumental in organizing the New York College of Dentistry.

His wife nobly co-operated with him not only in entertaining his many professional visitors, but attended the conventions with him and shared his interest and ambition to place the profession upon a higher level.

He was a member of many societies. Honorary member of the

Odontological Society of New York, Central Dental Society of Northern New Jersey, California State Dental Association. He was an active member of the First District Dental Society of New York, having been at one time its president. He was also a member of the American Microscopical Society, Odontographic Society of Pennsylvania, and other organizations.

About a year ago Dr. Atkinson had a severe attack of *la grippe*, and never fully recovered his vigor. Three weeks before his death a persistent bronchitis set in, which was followed by pneumonia, terminating fatally at 9.15 p.m., Thursday, April 2, 1891. His constant thought for professional advancement was indicated in the last intelligible conversation had with him, when he mentioned the fact that he had engaged to write certain papers, but had not been able to commence them on account of continued indisposition.

His family consisted of three sons and five daughters, of whom are living one son, Dr. Charles B. Atkinson, who has been his father's partner in practice.

Of the five daughters, three married dentists,—Dr. George Viall, Pasadena, Cal.; Dr. Thomas Rowe, Cobourg, Canada, and Dr. John M. Crowell, deceased.

Dr. Atkinson was buried in the family plot at Woodlawn Cemetery.

Current News.

COLORADO STATE DENTAL ASSOCIATION.

THE next annual session of the Colorado State Dental Association will be held in Denver, June 5-7, 1891.

J. H. PARSONS, D.D.S.,

Corresponding Secretary.

BOULDER, COL., April 9, 1891.

MISSOURI DENTAL COLLEGE ALUMNI.

THE annual meeting of the Alumni Association of the Missouri Dental College was held March 12, 1891, at the College building, corner Seventh Street and Clark Avenue. Ten new members were

elected to membership, including Drs. Newby and Wick, of this city, the others being members of the class of 1891.

Officers for 1891 were elected as follows: President, Dr. W. M. Bartlett; Vice-President, Dr. J. H. Prothero; Secretary, Dr. De Courcy Lindsley; Treasurer, Dr. Carl E. Schumacher; Executive Committee, Drs. Bowman, Prosser, and Whipple.

During the past year the following Alumni have been lost by death: Dr. Homer Judd, M. D. La Croix, John W. Forden, and Henry D. Field. The following committee were appointed to draft suitable resolutions regarding the foregoing, to be presented at the next annual meeting: Dr. W. H. Eames, A. H. Fuller, and John G. Harper. The by-laws were changed, doing away with annual dues.

MISSOURI STATE DENTAL ASSOCIATION.

ST. LOUIS, MISSOURI, March 31, 1891.

THE Twenty-seventh Annual Meeting of the Missouri State Dental Association will be held at Louisiana, Mo., July 7, 8, 9, and 10, 1891.

Two half-days will be devoted to clinics,—Wednesday and Thursday. Those having new specimens, models, new appliances and methods, should notify the committee in order that proper mention of them can be made on the programme.

WM. CONRAD,
J. W. WHIPPLE, } *Executive Committee.*
HENRY FISHER, }

CONNECTICUT VALLEY DENTAL SOCIETY.

The Twenty-seventh Annual Meeting of the Connecticut Valley Dental Society will be held at Hotel Hamilton, Holyoke, Mass., on June 10, 11, and 12. Arrangements already made indicate an interesting and profitable meeting. The clinics will be under the charge of Dr. L. D. Shepard, of Boston.

GEORGE A. MAXFIELD, D.D.S.,
Secretary.

HOLYOKE, MASSACHUSETTS.

THE International Dental Journal.

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No. 7.

Original Communications.¹

ANÆSTHETIC OPERATION FOR THE TREATMENT OF DISEASES OF THE ANTRAL CHAMBER.

BY J. N. FARRAR, M.D., D.D.S., NEW YORK CITY.

IN the *Dental Cosmos* for March, 1884, is published a paper explaining my plan of treatment for the cure of some cases of alveolar abscess by amputation of more or less of the abscessed root of the tooth, and several original cases are illustrated by section, to show the appearance of the tooth immediately after the operation. (See Fig. 1, from the paper.)

In the present article my object is to publicly answer inquiries concerning the operation upon this plan for reaching and treating the antral chamber. The plan, which dentists sometimes complementarily call by my name, consists in amputating the "abscessed root" that caused the antral trouble, leaving the remainder of the tooth undisturbed;² and this plan, of course, shows its best results in cases where the offending tooth has more than one root.

I regard this operation as superior to that of extracting the

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² In vol. vi. (1881) of the Proceedings of the Medical Society of the County of Kings (Brooklyn, New York) is a similar paper by me on the treatment of antral disease.

entire tooth, as illustrated by Fig. 2,¹ because by amputating the offending root the operation as fully rids the case of the cause of the antral trouble as would the extraction of the entire tooth, and it furnishes equally free passage for the nozzle of the spray-syringe to the antral chamber.

Fig. 3 illustrates a case showing the plan of the operation. A represents the right antral chamber; T, the tooth that caused the disease; C, the locality of the abscess; R, the place left after amputating the palatine root, which caused the trouble; S, the nozzle of the syringe spraying the chamber; O, floor of the orbit of the right eye.

Of course a tooth that has lost one of its roots cannot be quite as firm as when all of it was healthy and normal, but several years of experience show that such teeth are not only valuable, æsthetically, but are by a little care useful for mastication purposes.

The first conception of this operation was suggested in the case of a public speaker, to whose personal appearance the loss of a tooth would have been great injury. By amputating the offending root, I found that the passage-way to the antrum was at once opened, and the chamber were easily reached with the spray-syringe. The medicines used in this case was chloride of sodium dissolved in water, and chloride of zinc (solution).

ADJUSTABLE METALLIC PLUGS FOR PASSAGE-WAYS TO THE ANTRAL CHAMBER WHILE UNDER TREATMENT.

In the *Dental Cosmos*, vol. xxi. (1879), page 556, begins a paper on the construction and application of several forms of detachable antral plugs, made of metal, to prevent premature closing of passages from the oral cavity to the antral chamber during the treatment.

Fig. 4 illustrates one of these devices.

A later modification of the plugging apparatus, devised by me for a case in which the offending root was amputated, consisted of a piece of smooth round platinum wire, slightly larger than the tube of the syringe, and oval at the upper end. This plug, like some of the older ones referred to, was held in place by a clamp-band around the crown of a tooth (in this case the offending tooth). The connection of the plug with the clamp-band was made

¹ Taken from one of my early papers, published in the *Missouri Dental Journal*, 1879. This also illustrates the first spraying instrument for the antral chamber.

TREATMENT OF DISEASES OF THE ANTRAL CHAMBER

FIG. 2.

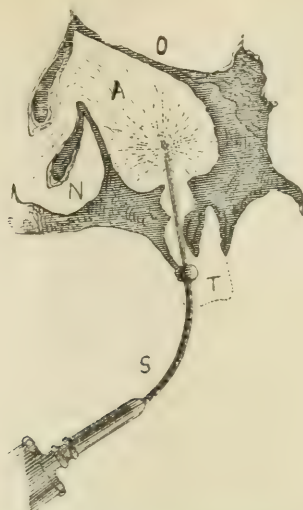


FIG. 1.



Section view of upper molar, showing appearance of the tooth after amputation of the lingual root.—*Dental Cosmos*, March, 1884.

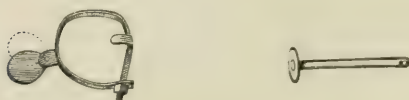
Section view of antrum, A, showing plan of treatment by spray-syringe, S, through the socket of an extracted molar, T, into the nares N.—*Missouri Dental Journal*, August, 1879.

FIG. 3.



Section view of the antrum, showing the author's plan of treatment through the socket of an amputated root.

FIG. 4.



A detachable antrum plug apparatus.—*Dental Cosmos*, 1879.

by a short piece of pliable platinum wire of much smaller size. These three parts were soldered together in such a relation that the plug rested easily in the canal, and caused no injurious lateral pressure upon the tissues constituting its walls. Before syringing the antrum the plug was removed, and it was returned after the operation.

PROPER CARE OF THE EYESIGHT.¹

BY LEWIS S. DIXON, M.D.

MR. PRESIDENT AND GENTLEMEN,—I have been honored by an invitation to give a few suggestions as to the proper care of the eyes and their preservation from unintentional abuse. At a time when one's attention is called in so many directions by the ardent advocates in many specialties, and the advice given is too abundant for any attempt to follow it all, it may seem superfluous to ask your thoughtful interest to this special subject.

But there are peculiar reasons why this topic should claim a little thought. First, because in your profession accurate vision and free use of it are matters of such direct importance in enabling you to apply your knowledge and obtain the good results and finish of workmanship that you desire. Secondly, because abnormal or imperfect vision adds such a decided and complicated burden to a work, of necessity, fatiguing and laborious. Thirdly, because the conditions of imperfect or faulty vision can be so positively detected and proved and so thoroughly corrected and relieved; for the advances made in certain branches of ophthalmology have carried us out of the region of probability and theory into that of almost mathematical certainty.

I am aware that, in speaking to those who have already in their studies paid more or less attention to the anatomy and physiology of the eye, I may need your kind indulgence for repeating much that is already familiar to many, but there are one or two fundamental points which it is of great importance to understand and realize, which experience shows are, as yet, but dimly recognized

¹ Read before the American Academy of Dental Science, Boston, March 4, 1891.

even by physicians, and yet they underlie and account for a large portion of the troubles commonly affecting the use of the eyes.

As a part of the body, and one of the organs of sense, many and complicated diseases may affect its various parts. Most of these are evident at once by external or easily recognizable symptoms; others, less common, affecting the deeper parts, not so evident, yet still almost always accompanied by such impairment of vision or definite indication of trouble as to call for attention. All these fall naturally under the care of the physician, and their diagnosis and treatment are to a great extent under the same limitations and uncertainties as hold elsewhere in the body. Such difficulties are of course not included in this paper. There are, however, a very large number of people who, having very good vision, or what they suppose is good vision, and no apparent disease, have more or less complaint to make, saying that their eyes are weak, incapable of comfortable or continued use without pain or discomfort afterwards. This leads them to feel it necessary to limit the use of their eyes, for they realize that in some way their eyesight is not quite as they wish it to be; and yet, as no apparent cause is discoverable, and vision good, they rest content with weakness as a sufficient explanation. Also, there is another large class, who, with excellent sight and no symptom calling attention to the eyes, suffer much from headaches, sick headaches, neuralgia, undue fatigue, and nervous exhaustion,—who strive in vain for any real relief through medicines and treatment, and are totally unaware that the whole cause lies unsuspected in the eyes.

It is, therefore, very necessary that, in order to take proper care of the eyes, one should know the meaning of the various signs that may be noticed, and be able to recognize the symptoms of overwork or strain and understand how it comes about.

For almost every one who has fair sight, it is very difficult to realize that seeing necessarily involves any muscular effort, unless it may be when looking at objects very near. Simply to open the lids seems all that is needed. This is practically true of really normal eyes, but, unfortunately, this class is much smaller than is supposed, and many who seem warranted in boasting of their fine vision are greatly surprised to find themselves not included. The important point to remember is, that sight involves two processes, entirely distinct from one another: first, the focussing the light from the objects looked at, so as to produce an actual picture on the retina; secondly, the perception or feeling of this picture by the retina or nerve of sight. The first is entirely an optical process,

controlled and limited by the laws of optics. The second is entirely a physiological process of the optic nerve and depends on its healthy action, which, fortunately, is the usual condition. The poor optic nerve has been greatly maligned, and all the impairments of vision whose causes were not evident or otherwise explained have been laid to its charge, but, unless on account of occasional disease or exposure to excessive light, it always acts well, and practically without fatigue.

Simply as an optical instrument, however, the eye may have numerous and complicated defects, which are entirely optical and fall under fixed laws capable of demonstration and proof. And so, unexpectedly perhaps, these optical errors must be understood before the meaning of the various symptoms and complaints in regard to the eyes can be made clear. The optical function of a normal eye is exactly that of a photographer's camera,—to refract or bend the light received from objects to a focus and produce a sharply-defined picture—in the camera, on the prepared plate, so that it may be taken; in the eye, on the retina, so that it may be felt or perceived.

It is well known that the photographer has to use great care in adjusting the focus of his camera for each picture he wishes to take, the slightest variation of light or distance of the object needing corresponding changes in the adjustment. This is due to the fact that the rays of light proceed from each point like the rays from a candle-flame, diverging in all directions, and that the nearer the lens of the photographer or of the eye is to the luminous object, the larger the cone or the more divergent the rays which will pass through it, and that as the object is removed, the cone becomes smaller and smaller, till at last the rays become practically parallel.

The normal eye is so built, or formed, that its lens, immediately back of the pupil, is just strong enough—*i.e.*, has the proper bending power—to exactly focus parallel light or that from distant objects upon the retina; the lens and retina are accurately adjusted to each other for ordinary distant vision. For nearer objects, instead of the camera's screw, there is a muscular arrangement for altering the strength or curve of the soft elastic lens, so that it may have more bending power as more divergent rays get in, and so still keep the focus upon the retina. These muscles give us the power of accommodation, or adjustment, for varying distances; and for every slightest alteration in distance we have to make the corresponding but unconscious adjustment. A normal eye, therefore, is one that sees everything beyond fifteen or twenty feet without

any muscular effort at all, being naturally adjusted correctly, the picture falling sharply on the retina if only the lids are raised, and the nerve having simply to feel or see the picture. And for all objects within fifteen or twenty feet, the muscular effort of accommodation is involved in rapidly increasing ratio as they approach the eye. Also, every one surely finds some point within which it is impossible to see clearly. This point, called the "near point," represents the full and utmost power of his muscles of accommodation.

It is the abnormal and unconscious overuse and fatigue of this muscular apparatus that underlies the larger part of the weakness and trouble of which people complain. It is not that the eyes tire or are overtaxed in their function of seeing the picture, but it is that, under certain conditions, the muscles are tired and are overtaxed in producing and keeping the pictures for the nerves to see. Three conditions which may produce unnecessary overstrain and fatigue will be worth a moment's explanation. These are old sight, or presbyopia; far sight, or hypermetropia, and uneven sight, or astigmatism. The crystalline lens in youth is quite soft and easily acted upon by the muscles of accommodation, but as early as eighteen years it begins to increase in firmness or hardness, so that the same muscular effort fails to produce the same amount of change in the refractive power of the lens, and the full action of the muscles fails to bring the near point as close to the eye as it used to do. This hardening steadily increases and causes the near point to slowly recede farther and farther off. At sixteen, or so, the near point is usually about two inches from the eye, but as one seldom wishes to hold objects nearer than eight or ten inches, there is a large surplus of reserve power, and the ordinary use of the eyes, on near work, is done with ease. But, as years go by, the near point creeps outward and the eyes are obliged to call upon more and more of their reserve power to accomplish the work they used to do easily. As long as the near point lies well within the working distance, vision can be used almost indefinitely, but when the near point has receded to nine or ten inches, one needs to get almost as near as that to his work, the accommodation is taxed nearly to its utmost, and the strain and fatigue are very great, for no muscle can work at its full power long at a time.

Since the progress of presbyopia, or hardening of the lens and recession of the near point, goes on very gradually, there is no sudden change, no marked symptom to draw one's attention. It will depend greatly, therefore, on the customary length of time the

eyes are kept at work at close range, upon the general health, and supply of nervous force not otherwise called upon, whether and when the eyes begin to suffer from old sight. Old sight really begins, therefore, quite early, but does not reach the condition of needing assistance until the near point has gone off to eight or nine inches; it means simply the overtaking of the muscles of accommodation,—not on account of the work done, but changes in the effort required to do the work; it means improper wear and tear to the nervous system, just in proportion to the demand for near work. Glasses assist this condition by bending the light partially before it reaches the eye, therefore leaving less work for the muscles to do and restoring the near point to a reasonably comfortable position.

Persistence in deferring assistance from glasses is unwise just as soon as conscious fatigue of eyes or head appears. Of course, like all other muscles, proper exercise, when not too long continued, prolongs their power and health, and in that respect it is unwise to put on glasses too early or unless there are distinct and frequent indications of fatigue. The point to remember is, that after reaching the age of forty, decided weariness, lassitude, headache, or pain in the eyes after long-continued close work is probably caused by overstrain of the accommodation, not by difficulties of general health or other reasons, and a moment's testing of the near point will often prove the cause. It follows that when close work,—*i.e.*, from ten to fourteen inches,—involves the use of nearly the full muscular power, the eyes should be frequently rested by looking off to the distance for a few moments; also, if the demands of the day involve several hours of near work, it is of course not best to continue the hard task by reading or writing in the evening, unless aided by glasses. Also, if for any other cause the system is not in good health, then the prolonged and exhausting efforts necessary for the accomplishment of the daily work not only have their injurious effect on the eyes, but use up, or rather waste, the strength needed elsewhere. Although the use of glasses can be deferred for quite a long time after they are really needed, the cost is very real and has to be paid in some way. Just as machinery may be run for some time after oil is needed, and accomplish its work well, it is with a waste of power and damage to the machine.

Again, there is the far-sighted, or hypermetropic, eye, very generally misunderstood. Unlike presbyopia, which develops slowly and becomes evident at middle age, this is a congenital and perma-

nent defect in original shape of the eyeball, which is not deep enough from before backward,—the retina is too close to the lens, intercepting the light before it has reached a focus ; a perfectly healthy eye with a lack of proper relative position of its lens and retina. This would naturally cause all its pictures to be blurred and indistinct. But as all eyes have the muscular power for increasing the strength of the lens, such an eye can, must, and does adjust the lens to the faulty position of the retina, and in that way sees perfectly well, but it has to use up more or less of its muscular power to get what the normal eye sees naturally and at rest. The far-sighted eye sees well enough, but not easily. The normal eye is like the rower on smooth water, who utilizes his strength only for progress and rests at will. The hypermetropic or ill-adjusted eye is like one rowing up-stream, who must spend much of his force in overcoming the ceaseless current, and has only the balance for real progress, and to him rest is impossible. The far-sighted eye is, therefore, of necessity, an overworked eye, not on account of what it does, but on account of its shape, for it has first to overcome its ever-present congenital defect, and in addition all the work of the normal eye as well. This constant, unavoidable work shows itself sooner or later in some form of fatigue or nervous exhaustion. There need not be the slightest impairment of vision or pain in the eye, but inability to enjoy continued vision without weariness, fatigue, slight nausea, headache, sick headache, neuralgia, sleepiness, or inability to fix the attention long at a time ; or there may be local symptoms of blurring, smarting, aching, or tired feeling in the eyes. Whether or not the hypermetrope experiences any of these symptoms will depend much on his general health, his supply of nervous power, and the amount of close work done. He may escape them all his life, if strong and well ; he may be made miserable in health by them, even while in school. Anything that lowers the tone of the system may cause the overtax to declare itself. Very often, however, since the hypermetrope never was able to compare his eyes with others, as to ease of seeing, he remains in entire ignorance that his sight costs him so much, and he may prove a constant patron of the physician for tonics and assistance to combat his various troubles, or else settle down to the belief that he must endure his discomforts as part of his make-up.

To properly care for one's eyes, therefore, one certainly ought to be sure that he was not unconsciously obliging them to bear the burden of a congenital error, and should know the signs pointing to such a defect. Suspicion should be aroused when one finds him-

self troubled by any of the above-mentioned symptoms or any form of nervous exhaustion, especially if it be noticed to follow continued use of the eyes, either near or far off. Hypermetropia may often be easily detected by testing how far off one can read ordinary print through a lens of known focal strength,—*i.e.*, if one looks through a ten-inch lens and can read clearly at a greater number of inches than the focal length, say twelve, fourteen, or more, then he surely is far-sighted. The lens may be of any strength between six- and eighteen-inch focus, and should be kept close to the eye. The farthest point for distinct vision for a normal eye is at the focal length of the lens.

It is by no means necessary for every one who is hypermetropic to wear glasses, for, if he experiences no signs of nervous trouble or over-fatigue, it is perfectly safe to leave the matter alone, although theoretically he needs help. But the recognition of hypermetropia should put one on his guard, and would supply a positive diagnosis for many forms of nervous difficulty which might arise, and explain many forms of fatigue and disturbance liable to be laid to the brain, the stomach, the liver, etc. Glasses for the hypermetrope simply take off the constant burden at will, do the extra work for him, and give him as fair a chance as normal eyes have. They make him see not a particle better, but easier. They save his accommodation for its proper use, and should be worn enough to make his vision comfortable. Of course, presbyopia will make itself felt much earlier in the far-sighted than in the normal eye.

The third error, very common and but little understood, is astigmatism, another congenital error of shape, this time not of the eyeball, but of the cornea or clear front portion of the eye. The cornea, being a curved surface, acts with the lens as part of the refracting apparatus, and should be like all lenses, truly spherical, but unfortunately it is very often far from true. Most frequently the curve is stronger in the vertical direction than in the horizontal, and these different curves refract the light unevenly, so that the light as it passes through the lens does not all reach the same focus,—*i.e.*, when the light which comes in through the stronger curve is properly focussed, that coming through the weaker curve is not bent so much and is not focussed, so the picture is blurred or streaky. If the eye, by means of its accommodation, adjusts itself for the weaker curve, then the vertical light is not focussed. Such an eye surely cannot rest, for it has to be very active not only for adjusting for different distances, but varying its adjustment constantly, even at the same distance, according as it needs to see the vertical

or horizontal parts of the outline ; for example, letters being made up of lines in varying directions, the astigmatic eye sees only certain parts of a letter clearly at once, but by rapid changes of accommodation picks them out with difficulty one part at a time. This condition, being congenital, is rarely recognized by the owner except in decided cases, for, having learned as a baby to make the continuous changes in adjustment, and having been obliged to do so all his life, he knows of no other way to see, and supposes he sees naturally ; but it costs his nervous system a constant amount of wearying fatigue, and is unavoidable. Using astigmatic eyes may in some senses be compared to riding with oval wheels ; one can make progress, but there is much unpleasant jarring and very little ease. Here, again, the results of astigmatism show themselves in some form of fatigue, not in the eye usually, but as pain at the back or top of the head, or in any of the ways already mentioned. There may be hardly any recognized impairment of vision. Astigmatism is not so easily found by the owner of the eyes, but the simplest test is to look at a set of fine radiating lines with each eye separately. If some appear blacker or clearer than others, and change with movements of the head, this error is surely present. Glasses here can be made to even the irregular curves and give the person practically normal eyes to use.

Another very common source of annoyance is the inequality of the eyes : one eye perhaps normal and one somewhat defective. Since the eyes from their mode of enervation must always act equally and together, it follows that one eye does not rest, even if closed or covered, but moves and acts exactly with the other. Also, that if they start unequal by construction, no amount of practice will enable them to adjust themselves separately, but one will always be ill-adjusted and an annoyance, for the brain receives the two impressions, which are unlike, and tries to combine them. Here, again, glasses build the eyes up to equality and ease.

It is often objected that the muscles spoken of are so small, their power so insignificant, their work so automatic, that the annoyance of glasses must far out-balance the benefit, and that certainly a man in ordinary health should not miss the trifling nervous power needed to overcome such errors. But it is to be remembered that the hair-spring of a watch is quite as important as the main-spring, and its ill-adjustment affects the whole watch. It is not the amount of the work done, but the continued obligatory action that is the starting-point of the disturbance. Every muscle needs some rest, but in these optical errors there is no rest

unless the eyes are closed or good vision abandoned. Rest to the hypermetropic or astigmatic eye means loss of focus and blurred sight, which will not be tolerated as long as one's will-power can hold out. Rest to the normal eye means rest, and yet perfect vision everywhere beyond fifteen or twenty feet. A blacksmith hammers all day with his heavy hammer because he rests between the blows, but to hold a feather at arm's length for half an hour is next to impossible, and the attempt to do so would disturb him in many more ways than the tired arm, and involve the whole power of his will and attention to prevent the longed-for relaxation.

But fatigue in its many forms is not the only result of these optical errors, for an increase in muscular work anywhere means an increased call for blood, and this, kept up abnormally strong and long, tends to induce in many cases chronic congestion. In the eye this may show itself either in the lids or their appendages, or may result in deeper-seated, less visible, but more serious physical conditions. When this congestion affects the lids, it appears by smarting, pricking, gravelly or burning feelings after use of the eyes, or in sensations of fulness, heaviness, sleepiness, or nervous twitching of the lids. It may affect the edges chiefly and make them red and scaly, with more or less loss of lashes. All these symptoms in lids may also result from truly local forms of irritation, as will be mentioned later, but more often some optical error lurks at the bottom, and this should be strongly suspected when the condition recurs after relief has once been obtained by local treatment.

The position of the head often necessary in the work of the dentist may sometimes induce, and at least would greatly aggravate, the tendency to congestion. Unless he uses the mirror largely, a few moments of erect position, thrown in frequently, would do much to avoid trouble.

The common complaint and anxiety in regard to floating black specks or spots is usually due to slight and temporary congestion of the back of the eye. In themselves these spots mean little or nothing, unless they are very abundant, large, or persistent. They are but the shadow of little particles which are present in the fluids of almost every eye, but the healthy eye does not notice them. If, however, from indigestion or any other cause, or more frequently from the ever-present strain of the overtaxed accommodation, congestion of the deeper parts of the eye is induced, then the retina becomes sensitive and irritable and notices them. Just as the sore finger seems to come in contact with everything, yet it is only

because it is more sensitive that it demands attention to the touches usually unheeded.

Photophobia, or dread of light, is another symptom of the same sort. Very often it is only a sign of irritation from some optical cause. Though this dread of light is present in nearly all inflammatory diseases of either the front or back parts of the eye, it is usually then accompanied by other more serious symptoms, as pain, tenderness on pressure, glimmering, flashes of light, dark clouds in permanent positions, impairment of sight, or some evident external signs of trouble needing medical advice. Just as the tired, overtaxed person becomes nervous and irritable and is fretted by trifles not ordinarily noticed, so the eyes, tired and doomed to constant unnatural work, become sensitive and annoyed by many things unnoticed by the properly adjusted eye. When the eyes are normal in action and have no local diseases, it is seldom that they object to severe and long-continued work, even if the general health is far from good, for they do get some rest. It is the weak links with flaws in them that give out under strain, and if the eyes begin to grumble there must surely be a reason. It is well, therefore, for every one who uses the eyes much to heed the early signs of fatigue or nervous irritation felt anywhere and see first whether, as is very likely, there is not some abnormal friction in the working of the eyes, which can be so easily and surely found, proved, and corrected, rather than search among uncertain possibilities elsewhere, or deny himself the free use of so valuable and willing servants. For if we review for a moment the long list of results following optical errors, smarting, burning, gravelly sensations, reddened and irritable eyelids, weak, tired feelings, headache, sick headache, pain in the eyes, blurring, twitching, sleepiness, itching, etc., etc., we find strangely that they include nearly all the complaints that are usually made, and experience proves that these errors, though not the only possible causes, are the most frequent and likely.

The question why there are so many defective eyes found nowadays deserves a moment's consideration, and has two answers: First, we know that in the organic world nature always works towards a perfect pattern in shape as well as function, but seldom attains it, and the result is infinite variety with but slight variations. Now, in all other instances, exactness of shape or form is not a necessary requisite for health or perfect function, but in the eye, as an optical instrument, it is the perfection of the curves and the accuracy of position of lens, cornea, and retina that give the per-

fect function of producing accurate pictures for us to see. But variations from the perfect standard are nearly as common in the eye as in the features or elsewhere in the body, and here interfere directly with the value of the organ; the burden of overcoming the fault falls upon the muscles of accommodation, which do their very best till compelled by exhaustion to complain. There is therefore nothing strange in the prevalence of such errors. Secondly, experience is unexpectedly showing the results of this overstrain and tax to be so varied and far-reaching that errors are looked for now where a few years ago they would not have been suspected, and the key to many a puzzle is found. This must be my apology for making this the prominent part of this paper; and yet there is one other reason, namely, the fact that both hypermetropic and astigmatic errors can be detected, measured, and proved by strictly objective or mechanical means, and thus there is no chance for doubt as to diagnosis. Errors cannot be found where they do not exist, though it is of course possible to overlook slight ones, and if errors are found the results are inevitable. Yet the mistaken idea which is so prevalent is that there must be some impairment of vision if error is present. To see well is one thing, but to see well and easily is quite another.

Myopia, or near-sight, has been purposely omitted, for, being in some sense a disease which affects the eye in childhood and youth, reaching a stand-still usually at the age of twenty-two or twenty-three, the time for attention to that form of optical error is while it is in progress and more or less amenable to care and treatment, and therefore is not of importance for you now. After myopia reaches its fixed condition, though a misfortune in many ways, it is not wholly an unfavorable one for the dentist, and does not lead often to trouble, unless complicated with other errors or of high degree. Myopia really is the giving way or bulging backward of the abnormally weak back part of the eye,—the eyeball becomes too long or egg-shaped, thus carrying the retina beyond the proper focus of the lens, and, there being no power of weakening the refraction, distant vision is permanently impaired. Contrary to the popular belief and the comfortable hopes of many, vision does not improve with age. Presbyopia comes on as usual, but is modified by the condition present, so that glasses for reading are not needed as early as usual, or in some cases never needed. This gain, however, is offset by the life-long loss of distant vision.

There are, of course, very many cases where the conjunctiva lining the lids or their edges may show simply local forms of con-

gestion, interfering greatly with their comfort, and brought on by various causes, such as exposure to excessive light, dust, wind, smoke, close air in ill-ventilated rooms or crowded halls, or, indirectly, by long-continued work with insufficient light, lack of exercise, etc., but such cases are apt to be temporary and vary with the action of the cause. All these symptoms are aggravated by close work or by artificial light. There is quite possibly even here some slight optical error that only prepares the way for the influence of these as secondary causes. Where none is found, the simplest remedies for the smarting, itching, fatigue, etc., are the use of mild astringent washes, such as the ordinary borax wash, ten grains to the ounce of water or camphor-water, or in more pronounced cases from one-half to two grains of sulphate of zinc instead of the borax; these applied three or four times a day. Also, the application of heat or cold, as may be most agreeable. These latter remedies, however, need to be used properly, for they are more powerful sometimes than is supposed. The object in these cases is, of course, to reduce congestion, and although this may be accomplished either with hot or cold water, the exact opposite can also be done with either, so that simply to advise heat or cold might result in anything but relief. For example, if the hand be put into very cold water a short time only and then removed, the reaction is so strong that very soon the hand becomes red and hot or congested; if, however, it is put into cool water a little below the temperature of the blood, and left a little longer, there is no reaction, but the temperature is lowered and the blood driven away for quite a little while. So also with heat; warmth draws blood to a part, but stinging heat acts powerfully in reducing congestion, and, as is well known, is a very valuable aid in checking hemorrhage. Therefore, stinging hot water should be used to bathe the eyes, or, if preferred, one or two thicknesses only of cloth wet in cool water laid over the eyes and kept wet, so as to gradually abstract heat by evaporation. Warm water only increases the flow of blood, and a pad of cloth wet in cold water quickly turns into a warm poultice. Position, also, has much to do with the result; if the head is bent down over the bowl and the water splashed upon the eye, both the position and the shock of the splashing tend to produce congestion, and the effect of the application is annulled. The hot water should be applied on a large cloth or sponge, with the head erect or reclining, and gently laid in the eyes and kept quietly there as long as the stinging heat remains, then renewed. This is a very refreshing application to tired eyes and head, but of course should not be

used too frequently. Often a congested or swollen state of the conjunctiva, by extending into the fine tear-ducts, causes a very annoying overflow of tears, especially in bright light, wind, or when the head is bent forward. Patient use of mild astringents and occasional application of heat, with the removal of any discoverable cause for the congestion, optical or otherwise, will usually bring about relief, but in many cases there is a real contraction or obstruction of the ducts, which, of course, calls for local treatment.

In regard to artificial light of various kinds, it is necessary simply to remember its prominent differences from daylight. Daylight is diffused light, proceeding, of course, primarily from the sun, but every object and the whole sky become also sources of illumination, so that the light is more even and shadows much softer. Direct sunlight we seldom permit to enter the eye. Artificial light is vastly less intense, so that the retinal pictures are much fainter and tax the seeing power of the eye more; and also, for the same reason, the pupil of the eye has to expand greatly to let in more light. This large pupil, from optical necessities, makes the focussing of the light less accurate and clear, just as in a camera the small stop with brilliant light will give the best defined pictures. Again, the light usually comes from one or more brilliant sources not far off, and direct light from these is apt to enter the eyes, or perhaps only one. This annoys and worries the nerves controlling the size of the pupil, for there is a distracting desire to dilate for the dimmer parts of the picture and to contract on account of the strong light from the flame. It is not the quantity of light which is apt to fret the eye, but the inequality in the illumination. Strong contrasts are fatiguing: a streak of sunlight on a light wall is more fatiguing than full sunlight over the whole surface, for the eye can easier accommodate itself. From this it follows that the sources of artificial light should not be visible while at work,—no direct light should get into either eye. With this point attended to, the more light the better. The preferable position for the light is above and a little behind the head. As to the kind of light, the important points are brilliancy and steadiness. Arc lights fail greatly in steadiness and so are not good for close work, and their excessive brilliancy makes their direct rays very trying. Incandescent lights, if shielded, are as desirable as any known, for they have brilliancy and steadiness and the additional advantages of lack of heat and contamination of the air. One other peculiarity of artificial light is the predominance of the yellow rays, which are more irritating

to the retina than the mixed white light. For this reason sensitive eyes often find great relief in using a chimney or shade of a very light blue tint; this neutralizes part of the yellow rays and gives a whiter and more agreeable light, like daylight.

The influence of tobacco perhaps deserves a moment's notice, though, probably on account of moderate use, but few in the dental profession run much risk from this cause. Still the danger from it is often so insidious and depends so little on what is considered an excessive use, that it is well to understand the matter clearly. Tobacco, as is well known, not only has its pleasant qualities which win so many adherents to its use, but it has very active poisonous qualities, which the system only learns to tolerate, just as it does opium, arsenic, and many other deleterious substances. It depends entirely upon the variable ability to absorb and eliminate the poisonous elements. If one absorbs a certain quantity daily, and is able to eliminate the same, the effect of tobacco will not be likely to be harmful; but if from any cause, or at any time, the power of elimination falls below the amount absorbed, then the system begins to be loaded or saturated with the drug, and, like a tank with ill-adjusted inflow and outflow, sooner or later it will suddenly overflow,—that is, unexpectedly the system will begin to suffer somewhere from the accumulated absorption of a long time. In the case of tobacco it may be the heart, the digestion, or the nervous system that will suffer first, or it may be the optic nerve will feel the full force and begin to wither and atrophy. If so, vision begins to fail in both eyes, everything acquiring a smoky, hazy look. This steadily increases without pain or annoyance, and unless one attends to it and the process is checked before it gets much headway, permanent loss of vision is quite sure to result. The danger is in its gradual, stealthy progress, without pain or symptom calling attention until vision is much impaired, and this, in those who have long been users of tobacco, and perhaps in only moderate degrees. The evils of the use of tobacco come, therefore, not in those who are beginning its use, not necessarily in those using it to excess, but in any one, at any time, whenever from one cause or another elimination is impaired. It is especially apt to show itself when the condition of the system is lowered by loss of sleep, anxiety, trouble, or decided change in habits, or by the habitual use of stimulants. The treatment is entire cessation from tobacco in every form, so that the whole power of the system may be used for elimination. One can usually retain what vision he has left when he commences treatment, but not surely.

On the whole, the eyes are much like other parts of the body, —when they are in order, we use them, hardly knowing that we have them, thinking little how they do their work, unaware of the many intricate processes and marvellous accuracy involved. Looking out over a broad landscape, or any comprehensive scene, one seldom realizes that the whole picture in the eye is but about an inch square; or as one looks across a broad street and recognizes an acquaintance, noticing all the minutiae of his expression and dress, down even to the cord of an eye-glass, it is difficult to comprehend that the real picture seen is only as large as the letter "i" in small print. Any one who has used a microscope will understand what nice adjustment is necessary for such minute pictures, and, as we are constantly looking at objects at varying distances, and have to adjust rapidly, yet perfectly, for each slightest change, and, moreover, have two eyes and two pictures which must fall on exactly corresponding portions of the retinae, or else give rise to very distressing double vision, also having to follow moving objects receding or advancing,—with all these complications, it is not hard to perceive that the work of the muscles of the eyes is not only very nice but very lively work. It is really remarkable how well and how untiringly fairly normal eyes do all this without fatigue or complaint. But if in addition they are burdened with additional obligatory and continuous work on account of congenital errors of shape, even then they do their best, but sooner or later the system feels the strain and has to pay the cost of the overtax.

Since normal eyes do so well, and so rarely complain, surely it is worth while to take some thought as to their proper care, heed the early signs of fatigue as one would the squeaking of a machine, and relieve it, if possible, not by stopping its use, but by removing the annoying friction. It is by no means claimed that the overtaxing of the muscles of accommodation is the sole cause of all the symptoms of nervous fatigue, but it is surprisingly often the exciting cause. The lowered tone of the general health, and the prevalent oversensitive condition of the nervous system, are generally prominent elements; but granting this, it must still remain the surer plan, if even adopted as a temporary remedy, to reduce by positive means the unnatural strain inevitably caused by these optical errors, rather than seek by uncertain methods to build up the health to the ability to bear the unnecessary burden.

A CURSORY GLANCE AT TETANUS.¹

BY G. LENOX CURTIS, M.D., D.D.S.

My attention was accidentally directed to the subject chosen through having been asked for advice in a case of tetanus, after I had accepted your invitation to address you this evening.

A railroad employé had his hand crushed, and the case came under the care of the company surgeon. On Thursday morning last the patient was unable to open his mouth, and the surgeon, knowing that I had given the subject of tetanus some attention, asked for my opinion. After hearing his statement, I advised amputation of the arm above the line of demarcation, for the reason that, according to the description, the hand would have to go anyway, and that it would be well to attempt to save the patient's life by making sure of the entire elimination of the source of the tetanic trouble. I further suggested that if the surgeon wished to test the actual presence of tetanus, he could do so in a few hours by inoculating a mouse with matter from the crushed hand; that the poison would quickly kill it, and that then the exudate would show, under the microscope, the presence or absence of the tetanus bacillus.

This incident suggested the bringing of the subject before you. Not that tetanus is a disease which falls within the usual province of the dentist, but that it is sufficiently related to the territory over which his jurisdiction ordinarily extends to justify the bestowal of some attention upon it; particularly as dental operations, carelessly performed, may readily induce the dread symptoms of lock-jaw. Cases have been recorded, for instance, of tetanus directly traceable to the irritation set up by replanted teeth; and although, so far as I am aware, there are no reported instances of its occurrence following the more modern implantation procedure, its appearance among the train of events consequent upon that operation would have been no surprise to many conservative practitioners.

It is well to get outside occasionally of the beaten track of the ordinary round of duties. Constant concentration of the faculties upon any given pursuit will, it is true, give one a mastery not otherwise attainable, but it may be questioned whether pre-emi-

¹ Read before the New York Odontological Society, Tuesday evening, April 21, 1891.

nence so gained is worth the cost. Just in proportion as one devotes himself to a single end will he lose the capacity for interest in and enjoyment of those things which do not assist in its accomplishment. Narrowing the field of knowledge and experience begets bigotry, the natural and logical child of narrow-mindedness, a condition not readily reconcilable with any legitimate claim for professional attainments. It is not only proper, but absolutely essential for one who hopes to achieve the highest honors of his profession to keep in touch not merely with related sciences, but also with the general progress of the age. To bring the application home to our own profession, it is undeniably true that, other things being equal, the broader the culture the better the dentist.

In presenting the subject of tetanus this evening there will be no attempt at orderly arrangement or exhaustive treatment. Time only permits the jotting down of thoughts as they occur. Sufficient will have been accomplished if your interest is awakened in even a slight degree.

The derivation of the word tetanus is Greek, and its literal meaning is "stretched," by which is accurately described the condition of the muscles affected. Notwithstanding that the disease has been long recognized and much written upon, there is even yet considerable doubt as to its pathology. Two forms are recognized, traumatic and idiopathic, the former arising from a wound upon any part of the body, though more commonly following injuries to the extremities, and the latter where there is no apparent lesion of the skin. It is perhaps an open question whether the latter, although exhibiting the same or nearly identical symptoms, is a true tetanus.

Trismus nascentium was formerly generally classed with tetanus, and even to-day there are many who recognize no essential difference between it and true traumatic tetanus. A very exhaustive paper on trismus was printed in the *American Journal of the Medical Sciences*, in 1884, from the pen of Dr. J. F. Hartigan, of Washington, D. C. In this paper, after quoting the opinions of most of the prominent writers on the subject for fifty years or more, he gave his own experiences, covering two hundred and twenty-nine cases, in many of which he had performed autopsies. His conclusions were as follows:

"Now, with regard to the identity claimed between this disease and tetanus in the adult, it will be apparent that the statistics presented do not confirm this view. It is also disproved by the comparisons of Dr. Sutton and others previously given. Holmes

mentions 277 cases of traumatic tetanus, of which only 130, or forty-seven per cent., were seized within ten days after the injury. I was enabled to learn the time of seizure from birth in 209 of my cases of trismus, of which number 189, or ninety per cent., were under ten days; while of the 88 reported by Stadtfeldt only one survived the tenth day. Matuszynski's 25 were all seen before the ninth day, and 107 of the 114 of Clarke's died before the ninth day.

"In a table of 327 fatal cases of tetanus in the adult, also reported by Holmes, 79, or twenty-four per cent., succumbed within two days. I ascertained the average duration of sickness in 207 of my cases to be fifty hours, of which number, 165, or about eighty per cent., lived two days and under, and 86, or forty-one and six-tenths per cent., lived one day and under.

"Another point in refutation of this claim of identity is the fact that in the tetanus of the adult febrile excitement is not essential, and if present is only secondary. Indeed, O'Beirne states that of 200 cases observed by him, not one was accompanied by fever. In every instance of trismus nascentium, where I took the temperature when the disease was at its height, I found an elevation, one case that I saw with Dr. Shadd, of the Freedman's Hospital, reaching 105.4°.

"Neither are the post-mortem appearances alike. The brain, medulla, and cord have been found in various conditions in the adult, but very rarely if ever have coagula been seen, although universally present in the infant. The similarity of these diseases in other respects I admit, but their etiological relations I deny. The principal basis of identity claimed is *that* trauma necessarily inflicted in the cutting of the cord at birth, irritating dressings, etc., to navel, which is supposed to correspond with the wound in the adult."

It should perhaps be added that Dr. Hartigan's experience and observation confirmed the opinion of Sims, that *trismus nascentium* was not at all related to the cutting of the cord, but was caused by dislocation of the bones of the head, occurring sometimes at birth, but more commonly through unskilful or careless handling afterwards, and producing brain-pressure by the displacement. Where the trouble was recognized in time, and the replacing of the bones was possible, a cure resulted. Certain it is that in the infant under five months all the symptoms of trismus can be produced in a few minutes by dislocating these bones at the occipitoparietal suture.

Traumatic tetanus has its origin in a wound of the surface of the body. As to the manner in which the characteristic symptoms are set up there is no positive knowledge. By some it is regarded as a reflex action, and undoubtedly it often bears this appearance. Others claim that it is caused by direct impingement upon the nerves leading to the wounded part. The latest theory upon the subject is that it is caused by a bacillus, and a so-called tetanus bacillus has been isolated. Since this theory was promulgated, the bacillus described has been seen by many other observers. Indeed, it is found as a constant accompaniment when searched for. In 1888, M. Bossano showed that the disease was bacterial in its origin, but that the transmission of the virus by inoculation through several animals brought about its attenuation and ultimately rendered it inert as regards the production of the disease. Personally I believe the bacillus theory is the true explanation; that tetanus comes from inoculation, and that otherwise the disease is not tetanus.

As to the source of the inoculation, it has been shown that most garden dirt—land that has been worked—is infected with this particular bacillus. Soil from different parts of the world was used in experiments on mice and guinea-pigs, and in nearly every instance it was found to be sufficiently charged with tetanus bacilli to produce death. It was also found that the more organic matter the specimen of soil contained, the greater the number of bacilli. We have here perhaps a clue to the universal locality of tetanus. Rusty nails, to which are commonly and correctly ascribed superior powers in the causation of lock-jaw, are also likely to be infected from the same wide-spread source. What wonder, then, that wounds exposed to such common opportunities of infection should be inoculated with the fatal poison?

For a statement of the symptoms of tetanus I can perhaps do no better than to quote Macnamara:

“Tetanus almost invariably commences in rigidity of the muscles of expression. In the course of a few hours the muscles of mastication and of the head, neck, and back become involved so that the patient experiences difficulty in opening his mouth, or in moving his head from side to side; and deglutition is impeded by spasmodic contraction of the pharynx. The rigidity of one or more of the groups of muscles above referred to is constant throughout the whole course of the disease; but in addition to this, from time to time these muscles are thrown into the most frightful spasms; in this way the patient's body is sometimes bent like a bow, the whole weight of the trunk being supported on the back of his head

and heels. The abdominal and thoracic muscles are also implicated, and hence the patient's belly is tense and hard, and the walls of his chest expand imperfectly in the effort of breathing. The muscles of the arms and legs are often extremely rigid and convulsed in a most violent manner; they are the seat of terrible pain. The interval between the paroxysms of spasm of the affected muscles is very uncertain; sometimes the cramps last only for a few seconds, at other times for five and even ten minutes. The most dangerous cases of tetanus are evidently those in which the muscles of respiration are principally involved, for death is generally caused in this disease by the interference with the respiratory process, the chest being, as it were, compressed in a vice. In consequence of the condition of the muscles of the neck and thorax the sick person is unable to speak, but his intellect generally remains clear up to the last, nor are the other functions of his body materially deranged. The patient suffers much from hunger and thirst, which he is unable to alleviate; and, above all, he longs for sleep, which is frequently denied him in consequence of the recurring spasms. The surface of the skin is bedewed with perspiration and the pulse rises and falls with the intensity of the spasms and the duration of the disease."

Tetanus runs a definite course. Sometimes it kills in a few hours, but the greater number of victims die from the seventh to the eleventh day after the commencement of the disease. If they survive the twelfth day, a cure usually occurs.

As to the treatment, thorough understanding of that is perhaps not so important to us as dentists as is a full and accurate knowledge of the diagnostic signs of its presence, more especially as its first expression is found in the face, and one of its most serious phases in the locking of the jaws. In general, it may be said that there is really but little to be done in the way of internal medication. Most of the drugs which have been prescribed to arrest the progress of the disease or allay the violence of the spasms fail to accomplish recognizable results, unless pushed to an extreme which threatens grave and scarcely justifiable complications. The first indication should be the thorough cleansing of the wound, which should be placed at once in an aseptic condition and kept so. If such a procedure were promptly instituted and skilfully carried out in all cases of wounds, I think it extremely probable that traumatic tetanus would cease to find victims. Professor Garretson regards phenol sodique as a sheet-anchor for dressings as a prophylatic against tetanus.

In any event, when tetanus is developed, it is a safe plan to bend every energy towards keeping the patient alive until the malady has spent its force; more especially because of the well-ascertained definiteness of the course of the disease, although its duration is uncertain, so that, if vitality can be preserved through the terrible agony that must be endured under the double deprivation of natural sleep and normal nourishment, there need be but little apprehension of fatal consequences. Under the conditions presented this is no easy task. The administration of food and the procuring of sleep are alike difficult and uncertain. As food, milk is, of course the staple, and as a sedative hydrate of chloral will perhaps produce as good results as any.

If the germ theory be finally accepted, surgical interference, where practicable, will be indicated, and fortunately the great majority of wounds which eventuate in tetanus are so situated that amputation of the affected part is entirely feasible. Cases are on record, also, where division of the principal nerve, or in other cases stretching of the nerve leading from the wound, has completely stopped the progress of tetanus.

Perhaps enough has been said to attract your attention to this formidable disease, which has been the object of the preparation of this brief paper. Much could have been said had the purpose been a didactic exposition of the subject; but to suggest a thought upon what may readily occur in the practice of any of us was all that was sought. Fortunately for our peace of mind, although the records show a few cases, tetanus as a sequel of dental operations is exceedingly rare. Professor Garretson has never met with a case; nor have several other gentlemen to whom I have spoken. Let us hope that our experience in the future may be equally fortunate. If what has been said here has the effect to make even one practitioner more careful in the performance of such operations as have been proved to occasionally produce tetanus, I shall be most glad of having been the instrument of so much good.

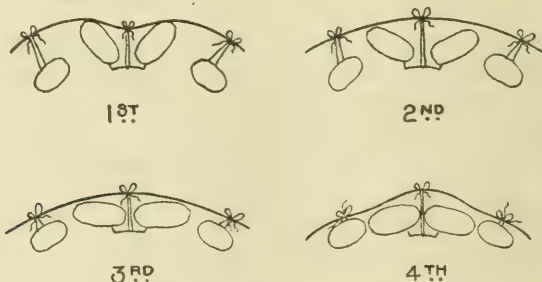
A METHOD OF CORRECTING IRREGULARITIES.¹

BY J. LEHMAN EISENBREY, D.D.S.

With a narrow strip of gold plate—No. 25 or 26 United States gauge—and two thicknesses of gilling-twine, results most surprising can be gained in the way of correcting dental abnormalities. The gold strip must be lightly hammered to give it temper, or platinized gold may be used instead. With these we can draw, push, rotate, and crowd into position irregular teeth.

The case of Harry P., aged eleven to thirteen years, occupied about two years. I never push the operations, but prefer intervals of rest. And I find this method brings better, surer, and, strange as it may seem, quicker results.

To the question so often asked, When will the operation be completed? When finished we both will know it, so let us work earnestly in the present and let the matter take care of itself. If a time is fixed, and then not met, demoralization is the result. In these models before you, and the appurtenances, you see all that



was used in putting in position these ill-arranged teeth. The caps were worn for one year, day and night, being only taken off at meal-time or for cleansing. In the mean time the cuspids were coming through, and they were directed into position by daily pressure of the thumb long continued. The teeth became much discolored under the caps, but that was all removed by the felt-wheel and tooth-powder.

I have been asked why I do not use rubber tubing to help

¹ Read before the Pennsylvania Dental Society, July, 1890.

matters along? And my answer is, I do not want fast help, and, besides, it occasions intolerable and continuous pain. It allows of no resting period to the patients, and so breaks their little hearts.

The positive force of the gilling-twine—put on dry—exhausts itself in about two hours, and so the patient has courage to bear up for that length of time. The good work is still going on, though with bearable pain and soreness, in contradistinction to a pain that interferes with school studies.

The ligatures should be changed twice in each week.

After a tooth begins to move and absorption takes place, a very gentle pressure is all that is needed to keep up the absorptive action. Now, my reason for going slow is to give the reparative process a chance to take place, so as to hold all that is gained. Then, again, rapid movement means destructive inflammation, which is to be avoided, while up building inflammation is necessary.

The case of Alice L., aged thirteen years, I present for your instruction and for the purpose of inciting discussion among you. Her lower maxilla is very prominent, with the molars only occluding. She is now wearing a draw-back bridle nightly, which will change the angle of the jaw. The upper maxilla I am expanding, and shall bring the circle forward a quarter of an inch. I will extract no teeth. The cuspid of the left side is, as you see, in the roof of the mouth. Next year I will cut it out.

The plates for expansion are movable, which is most desirable wherever possible.

The plate used for enlarging and drawing forward circle and rotating teeth is changed on Saturdays and Wednesdays and thoroughly disinfected. For this purpose there is nothing better than the imported phenol sodique, and for all or any condition of the mouth it is unexcelled. As a disguise, add some cologne. These models show five months' work, and another five will see them in their proper places.

These two patients were full of endurance, and may you all meet with like natures.

THE EXTRACTION OF THE FIRST PERMANENT MOLAR.¹

BY DR. EUGENE J. WETZEL, MULHOUSE, GERMANY.

THE usual cause of premature extraction is caries, and this has also to be resorted to in cases of overcrowded dental arches; no blame can therefore be attached to the operator who has acted with proper judgment.

Our present style of living differs greatly from that of the past; the climate is undergoing gradual changes, and habits also change with the advance of civilization. The food now taken does not require the same mastication as that formerly used; the nervous system is more irritable, due to high pressure, education, and social conditions. The effect of these changes is, that while the jaws are growing smaller the dermal appendix remains the same, and we see overcrowded arches, irregularities, and caries more frequently.

The first teeth of the permanent denture which are erupted are the first molars, this occurring at the sixth year.

Physiologically, the first molar is the most useful tooth in the whole arch; it presents the largest area of crown-surface, is situated in a position where mastication is greatest, and is admirably adapted to bear strain.

It is more liable to caries than any other tooth, caused probably by imperfect structure, on account of its development at the period when nutrition in the child is often at fault.

In the sixth-year molar, then, we have two great characteristics, its utility in mastication, and its tendency to decay. These teeth often show some signs of caries when their grinding surface is hardly free from the gum, and a few months after there are very large cavities to be seen. I think I can safely say that no more than six per cent. of these teeth are spotless and of good quality, which is a sadly small number.

These teeth, then, have to be watched from a very early period and filled, and if not of a medium quality have always to be repaired.

Since the first molars are so liable to decay, it will be found at all times a difficult matter to put a permanent filling in these teeth.

¹ Read at the meeting of the Harvard Odontological Society, by Dr A. H. Stoddard, Boston, November 29, 1890.

When considering our treatment we should bear this fact in mind, should such a filling fail we are worse off than ever. I should therefore advise the extraction of all first molars if premature decay has attacked them, and we then have no certainty of introducing a permanent filling.

Having in an overcrowded mouth moderately sound first molars, there arises the question, Should some one of the bicuspid or the molars be removed?

For this a very fixed rule cannot be stated; but I think to remove teeth in order to save others from caries is not at all bad practice. We may safely say that if a first molar remains good until the age of twelve, and has withstood the secretions of the mouth, it may safely be kept in place.

There is no doubt that there are cases in which we should adopt radical treatment, and if only two such teeth are carious I should strenuously advise the removal of all four. The spaces left will be gradually filled by the twelfth-year molars and the second bicuspid. Should one sixth-year molar be extracted, the opposing tooth will be locked (and the space remains). It is then useless for mastication, and caries will make rapid progress.

Presuming extraction has been chosen as treatment, the question arises, When should it be done?

Should we extract the first permanent molars before our little patient has attained the age of twelve? Should they be carious we should employ all our means to fill them in order that they may last until the age specified for extraction. I think the best time for their removal is when the twelfth-year molars have fully erupted, and their grinding surfaces touch each other; their forward movement is then more even.

Should all the four teeth be removed at one sitting? I think not; a better way is to remove first on one side, waiting till the wound is pretty well healed and the patient is able to masticate on that side again. There is no harm to wait two, four, six, or eight months. If they are removed all in one sitting, the patient will have to wait several weeks till able to masticate on the sides again, and the neighboring teeth will suffer considerably.

The best filling for such teeth is Sullivan's amalgam (or what is called in the States copper amalgam), it has the tendency to harden softened dentine.

THE RELATION BETWEEN DENTAL CARIES AND DIET.¹

BY L. ASHLEY FAUGHT, D.D.S., PHILADELPHIA.

A PERFECT understanding of the relation we are about to consider must necessarily lie somewhat in a comprehension of the term "dental caries." Many definitions have been proposed, and each with its weight of authority; but I would express the following as possibly the one of most general acceptance: Dental caries is purely chemical alteration of the enamel and ivory of the teeth. This alteration is in its final results destructive of the tissues involved, and progresses from the outside to the inside of the tooth. The peculiar province of the dentist is threefold,—to arrest this action, to repair its ravages, and to defend the teeth from its attacks. The last mentioned is in its nature essentially preventive, and is to be comprehended largely by a study of the relations of diet. I admit that the effects of diet are also reparative; but I conceive a special interest in its bearings as a protective agency, and to this I desire now to invite your attention.

As a preventive means, diet either exerts a well-marked influence upon the anatomical structure of the teeth, or it has for its aim the suppression of contact with teeth of agents of alteration, or the neutralization of their powers. The influence upon anatomical structure is confined to the tissues other than enamel, for this substance is not reconstructed, consisting as it does of a single series of cells, and, being once lost, is lost forever. Such influence also requires necessary conditions under which to operate, proper pabulum, proper state of the organism to appropriate, and proper power to assimilate. That the system rejects all chemical foods from the chemist's laboratory, and only receives things which come in nature's own way, is a maxim so true that it is worthy to be laid down as a fact in connection with this phase of the study. Phosphate of lime is a tooth-essential, but nature uses only those phosphates which are presented to her in connection with albumen. Wheat is a source of its supply, par excellence. Oatmeal, which has phosphate of lime so necessary for infants, should be mixed with cow's milk when giving the latter in the place of mother's milk. The age of childhood is particularly the age for the structural effects of appropriate

¹ Read before the Pennsylvania State Dental Society, June, 1890.

feeding, for functional action is not the same in all ages, and this makes a great difference in the power of repair, which seems to become lost at later periods.

While one cannot doubt that it is possible to influence nature by appropriate diet, yet the fact that but little repair in more mature human teeth has been discovered, though greatly needed, would indicate that she has not the ability to do it. Any study, therefore, of the relation of diet to dental caries will prove profitable, not so much in proportion to the effort expended in an examination of its effects upon the *inside* of tooth-structure, as in the comprehension of the bearings productive of *outside* elements which may act upon the teeth.

Recognizing, then, this fact, the point of our observation is to be directed to a consideration of the chemical changes which diet may produce in the fluids of the mouth; and which by their perverted condition destroy the enamel, and lead up to those secondary actions, which, being permitted entrance through this external plate, run riot in the softer structures, breaking down and destroying the teeth. The normal saliva being alkaline, must through such agencies become acid. These acids here factoring are either sulphuric, hydrochloric, nitric, or lactic. They are produced more frequently through the direct relation of the food, though not infrequently through derangement in the intestinal tract. This latter condition is to be met by guarding against irregular eating, for trouble will surely follow eating between meals, a habit which seems to be firmly engrafted upon the present generation.

Children, following the bent of their own inclinations, and led on by the prejudicial example of their elders, fail to perceive that the stomach and its appendages are simply a chemical laboratory; and that material introduced at any one period requires a definite time for proper disposal; and that the retorts, tubes, and chemicals used in the process need time for repair and replenishment. If this quantum of rest is not given, they will surely be in bad condition and do very imperfect work. This fact should in this age be taught with emphasis until our *clientèle* accept the delicate adjustment of the human organism, and learn that indigestion is an immense factor in the disturbance of perfect nervous balance, and that lowered nervous tone means a proportionate lowered tone in tooth-structure. Here, then, is a cause in dental caries which should not be forgotten in answering the oft-repeated question, presented to us with much anxiety of mind,—Why do my teeth so decay?

One should know, too, that ruts are not always good things in which to fall, and carefully avoid sameness of food. Change in diet calls for change in its chemical disposal, and evil effects are not continued long enough to leave their impress upon the dental organs; while variety will always continue a full supply of the necessary ingredients of tooth-tissue, for food quite different in the form of its presentation is nevertheless rich in nearly all instances in the same elements out of which nature by recombination may produce continually a definite structure.

Let us now consider the production of acids in the mouth. Recognizing the presence of nitric acid in the white decay around fillings and the necks of the teeth, the food recommended should be rich in carbon and not in nitrogen. Non-nitrogenous food is indicated,—lean meats, eggs, cheese, etc., are to be avoided. When the acid reaction is due to hydrochloric acid, the patient may partake freely of vegetables and milk, but not at all of salt foods. The presence of black decay, due to sulphuric acid, should debar food containing sulphur; while evidences of erosion indicating the action of lactic acid must in like manner promptly erase from the diet-list such articles as milk, meats, saccharine materials, and amylaceous substances which are so easily converted into dextrine.

The two points which I desire to recapitulate as the lesson for concentrated consideration are, that dental caries requires the outer tooth-plate to be broken, disintegrated, or removed before further progress can take place, and this destruction is in a large measure due to the action of acid oral fluids; and that whether the oral fluids shall be acid or alkaline is largely dependent primarily upon the condition of the digestive system, or secondarily through its reflex disturbance of the nervous system. Keep the digestive system normal, and the nervous system in serene equilibrium, and, all things being equal, a limit is placed upon dental caries.

I trust that the province of this paper may not be misunderstood, and I do not wish to be assigned a place among those who do not comprehend or appreciate the other accepted causes of dental caries, such as germ potency, lowered vitality, vicious approximation, heredity, etc. They are factors to be recognized, but the truth as here enunciated is to my mind common-sense, solid doctrine, and will prove a sound basis upon which may be founded a system of advice to patients productive of much salvation in tooth-structure.

SECRET PREPARATIONS.

BY DR. S. B. PALMER, SYRACUSE, N. Y.

THE numerous venders in our profession of secret preparations would seem to indicate that there must be purchasers, and that dentistry is on a retrograde movement. Surely we can hardly imagine that individuals are so highly interested in suffering humanity as to give their time gratuitously to this work. I was requested to try an obtundent for sensitive dentine and report my opinion. The assurance was given that the compound contained no "arsenic, strychnine, or any drug that could destroy the nerve." Having made the examination I feel it my duty to give the conclusions to the profession as well as to the discoverer. The following is the result of the trial: Three drops of the obtundent were added to one ounce of water. The test gave a strong acid reaction. The next was for a metal: the electrodes from a battery were attached to two plates of gold-foil, and before the gold was lowered half-way its length into the fluid that portion at the negative pole became coated with a metal of a dark lead color. In the report made to me Dr. James Truman's name was mentioned as one who by letter abruptly refused to make a trial of the obtundent. I sent to him the gold electrodes and test-papers as evidences that his position in refusing secret compounds was the correct one.¹ To give the name of the dentist referred to might be construed as a breach of confidence.

The only true method to adopt in cases of this nature is to educate dentists to refuse the use of all preparations in cases where there could be a possibility of harm resulting. No one can tell the final results of an unknown metal in its action upon vital dentine. We know something of the effects of arsenic when used as an obtundent; other metals with combinations may be equally harmful. When escharotics are applied to muscle, sloughing occurs, which might be dangerous if received into the circulation. Dentine being a solid, retains all that cannot be washed from the surface.

There are two distinct methods in the action of an obtundent. One is suspended animation as produced by hot air, cold spray, and by various other temporary agents; the other is devitalization of

¹ Dr. Palmer sends with his paper two gold electrodes and several test-papers as evidence of his statements. One of the electrodes sent indicates a deposit of a dark lead color, and the test-papers give marked evidence of acid reaction.—ED.

sensibility, as by arsenic, mercury, acids, etc. In dentine the dead portion must remain in contact with the living. When a metallic acid is introduced the acid is soon neutralized by the lime to render its further action harmless. This sets the atoms of the metal free to combine with the vital elements of the organic structure, and the process of devitalization continues, possibly for years. We have a correspondence in the effect of a few drops of acid upon the pages of a book. History and observations fail to limit its action; in fact, the destruction we are told does not stop, the leaves crumble and fall away in dust; so "dry-rot" in timber in time destroys wood.

The science of this vital action seems reasonable, as, I believe organic bodies are built from within by currents of a negative or alkaline nature; externally are the opposite or acid currents. Let us apply this statement to a condition of the teeth occasionally seen, which have been worn to the gums, the pulp having receded and protected itself by secondary deposits. At no time have the pulps been in an abnormal condition, consequently the organs of nutrition did the work. If the destruction of tissue be from cavities or by lodgement of food allowed to ferment, no such resistance would occur, because the potentials would be changed. I believe both in the polarity and potential of vital currents, as in the electroplating, where the changes can be witnessed.

The absorption of the roots of deciduous teeth afford still another illustration. By reversing the nutrient current the root is absorbed by a process opposed to that which built it up. In this case two or more roots only are subject to the resorptive process. In case of gestation the whole secretions become abnormal, and all the teeth are effected in that a portion is taken from the lime elements. There is an uncultivated field in this direction, yet the promise is great, and the way seems much less difficult than the solving of the problem which has so recently been done. Why do teeth decay?

LOCAL ANÆSTHESIA AND THE DENTISTS.¹

BY DWIGHT M. CLAPP, D.M.D., BOSTON.

WE shall publish in our next number a study of the legal aspect of this subject, but just before going to press we received a pamphlet from our *confrère*, M. Bouchard, dentist, at Lille, giving

¹ Translated from *L'Odontologie*, January, 1891.

an account of a fatal accident that occurred in his office. The subject is of so great interest that we give the following extract immediate publication :

"Miss X. called on the 7th of August to make an appointment for the following day, Friday, at seven o'clock, A.M. On that day I proceeded to extract two superior teeth after having made two external and one internal subcutaneous injections of a solution (cocaine) of one to one hundred,—*au centième* ; the teeth were very loose and the success was complete. After several minutes my patient expressed a wish to have another tooth in the left inferior jaw, and equally as loose as the others, extracted. I injected the rest of the cocaine in my syringe and after waiting a few minutes extracted the tooth. The wound did not bleed. I gave the patient a little warm water and a little black coffee to induce the flow of blood. Nothing appeared to indicate an accident ; the patient seemed to be all right, although somewhat fatigued. I left her in the care of her uncle while I went for more coffee.

"On my return the young lady had fainted. She was placed on the floor, her clothing loosened, dashes of cold water, friction,—in short, everything was done that the situation indicated. The physician, hastily summoned, continued the same treatment, and, in addition, gave nitrate of amyl, oxygen, and subcutaneous injections of ether ; but the patient succumbed after a half-hour of unsuccessful treatment.

"The physician who made the death certificate, after describing the fainting of the patient, concluded that death was caused by cocaine, as that salt had been employed.

"Was cocaine the cause of death ? I will prove the contrary.

"When the honorable doctor incriminated cocaine he was ignorant, as I was myself, at the time, that a large knotted cord, called *corde à lessive*, was wound four times around the body of the girl, compressing the thorax. This cord was drawn so tightly that its presence was not suspected and could not be cut without injury to the skin.

"This explains why the attempts at artificial respiration were unsuccessful."

AN IMPROVEMENT IN FLASK PRESSES USED WITHIN
THE VULCANIZER.

BY WILLIAM H. TRUEMAN, PHILADELPHIA.

THERE are on the market several flask presses designed for use in the process of packing into the flask vulcanizable gums that, by spring pressure, gradually, as the prepared gum becomes plastic by the heat applied, closes the flask while it is under steam pressure in the vulcanizer. The practical advantage of so doing is generally recognized. The fault I have found with all such presses so far brought to my notice has been that there is not sufficient run to the screw by which the spring is compressed, the flask must be nearly closed before it can be placed in the press; and also that they require special flasks. Both of these objections I have overcome by the following simple and inexpensive device. The presses are made to hold as many flasks at one time as the vulcanizers they are designed for will contain; there is supplied with them for use, when less than the full complement of flasks are to be packed and vulcanized, a metal block, intended to take the place of the flasks not used. This block I have replaced with one a little more than half its height, having fitted to it a pointed screw about a half inch in diameter projecting centrally from its upper surface, and working in a hole drilled and tapped entirely through it. By this means the height of the block can be adjusted to accommodate the flask used, or to allow the flask to enter the press without undue pressure. The pointed end of the screw fits into a countersink usually found on the lower end of the screw of the press, or, where this is absent, one made to receive it. This renders unnecessary the revolving washer there found, and which may be removed, giving that much more run to the screw and increasing its usefulness. The press thus improved will hold most of the flasks now on the market. The device can be applied equally well to all flask presses intended for use within the closed vulcanizer that I have seen. I therefore deem it unnecessary to name them. I would, however, suggest to the makers—and this applies to all—that the wire upon which the lower plate rests and rocks is entirely too small and weak for the service required. It should be of tough steel (not tool steel), and twice the diameter. The hole in the frame through which it passes should be sufficiently far from the end, or so strengthened as to render tearing out impossible. It

is better, if either are to give way, that it should be the wire, as it is more readily replaced; it is much better, however, to have the apparatus amply strong for practical use. The pressure required to close the flask as it should be closed, even when carefully applied under favorable conditions, is very much greater than is generally supposed, and these we cannot always command.

I do not consider it wise to vulcanize, trusting to the press closing the flask, but always open the vulcanizer and inspect the flask to see that it is properly closed, and either increase the pressure, or remove it from the press and adjust the usual screws before proceeding.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held Tuesday evening, April 21, 1891, at the Academy of Medicine, No. 17 West Forty-third Street, New York City.

The President, Dr. William H. Dwinelle, in the chair.

INCIDENTS OF OFFICE PRACTICE AND CASUAL COMMUNICATIONS.

Dr. J. Bond Littig.—Mr. President, I would like to present to the society this evening a method for enamelling the faces of all gold crowns. We all know how conspicuous gold crowns are in the mouth, which characteristic has always been very objectionable to me, and I have tried various devices for remedying that difficulty. Since the introduction of glass fillings, I have hit upon a plan which removes almost entirely the unsightly appearance, and I thought it might be interesting to describe how I did it. After fitting the ordinary gold crown to the root I remove the crown and fill it with modelling composition, to keep it from bending. Then, with the ordinary jeweller's saw, I cut out the lower part of the buccal surface of the gold crown, commencing at the cutting-edge, leaving a ring of gold at the top. I then remove the composition and fit a piece of either thin platinum or gold—I prefer the platinum—to the inside of the crown, just to the edges of the opening made with the saw. I always thicken the crown at the cusps with solder, using twenty-carat solder for that purpose, and, holding it over the burner, I solder the little piece of platinum at one end, and then add the glass filling of the proper shade. It depends a great deal upon how this is fused, whether it brings the color out or not; if it is fused too much, it bleaches; if fused too little, the color is not brought out. After wetting the glass with distilled water, I pack it in over the platinum, and with some bibulous paper make it as smooth as possible; then hold it over the alcohol lamp with the pliers. If not plump enough, I repeat the process until I have it contoured to my satisfaction. I have had some of these enamelled crowns wearing in the mouth for six months, and there has been no change. I thought it was a sufficient test to justify me in describing the process.

I have tried another way too,—that of grinding very thin pieces of porcelain from English teeth, or even American teeth, fitting them towards the surface, from the inside, and fusing glass around them. That gives the color a little better, but it is more work. Enamelling by the first method can be done in ten minutes' time, and I think the gentlemen will find, when I pass this crown around, that the improvement in appearance is considerable.

The President.—This is a very interesting subject, and refers to a thought that has passed through the minds of almost every dentist,—the wish, at least,—that this could be accomplished.

Dr. J. Morgan Howe.—I can testify to the practical and artistic success of this device which Dr. Littig suggested to me some time since, although I have used it in only one case,—one in which a small cap seemed to be about the only thing that could be used to preserve the tooth, without the necessity of destroying the pulp. Posterior and anterior proximal cavities had so weakened the buccal wall of a bicuspid tooth that it broke down, although the pulp was alive. By means of this device, of putting a veneer of color, approximating the color of the teeth, on the buccal face of the cap, I made what was to me a very satisfactory operation; and, as Dr. Littig says, the use of the glass in facing the gold cap did not take over ten minutes' time.

Dr. S. G. Perry.—I have been, for a long time, a believer in mallets. I have used the hand mallet, the automatic, the electric, and, during recent years, the Bonwill mechanical mallet, but I have never given up my old love for the automatic, four or five of which I always keep at hand. I have had some changes made in them which I think have been an improvement. I have had vulcanized onto the small end a black rubber "nozzle," which is very smooth and pleasant to use in the hand, and so shaped that the fingers find suitable support in pressing the instrument. The socket ends of all these instruments are made small and tapering, and become, when held like a pen, quite inconvenient, if used for a long time. I have had these nozzles constricted in their centres, so that the fingers, grasping the constricted portion, find support, and there is no chance of slipping. Some may think that the size of the nozzle would become an objection, by rubbing against the cheek, but I have many of my points made long, and get over the difficulty in that way. These instruments were sent to Hood & Reynold's, in Boston, and made over.

One of the first requirements in an automatic mallet, it seems to me, is that there shall be no side movement. I think these are

close-fitting, and very smooth in their action. One other advantage is to have the springs made soft and easy to work. Following a suggestion made by Dr. J. A. Woodward, I always anneal the spring before I use it, which makes it very soft. Recently I have had some little burs made for finishing fillings, which are not cut like ordinary burs, being made very fine. They are like a fine file, and they give a finish that I cannot get with anything else, unless it is a fine stone, which wears out rapidly and which cannot be used very small. They do not cut rapidly, but they are not meant to do so. They are particularly well suited for use at the edge of the gum on all labial surfaces.

Some time since I called the attention of this society to some little sand-paper disk mandrels that I had made, with a delicate nut and holder for the same. At that meeting, Dr. Jarvie stated that he had seen, at Albany last year, a mandrel made without a nut. I thought about that, and afterwards remembering that we have mandrels made with corkscrew points for holding leather wheels, etc., I saw very quickly that that same idea, applied to our disks, ought to succeed. I had some of those mandrels made in that way, and, much to my gratification, I found they worked quite perfectly. One would suppose a sand-paper disk would not be strong enough to bear the force, and would tear off, but the sand-paper is flexible and springs away from the tooth or filling while revolving, so that, after all, they do hold well enough to wear out the disk. I have the disks and mandrels made in three different sizes, and find them almost invaluable in finishing fillings. The smallest disks are only one-quarter of an inch in diameter, and they reach where the large ones cannot. These little ones are invaluable in finishing on the labial surface close to the gums and along the exposed borders of proximal fillings.

If the cutting surface is on the outside, they do not slip off; and if it is on the inside, they still do not pull off unless they are used carelessly. When a disk becomes warm, touch it with the finger, and off it goes; there is no time lost in changing a nut. Whatever advantage may arise from a mandrel without a nut the credit is not with me, of course. The suggestion came from Dr. Jarvie. I have never learned the gentleman's name who showed them, and have never heard a definite description of how they are made.¹

Dr. Brockway.—I think that is the way they were made.

¹ Since these remarks were made I have learned they were first shown by Dr. M. L. Rowe, Albany, N. Y.—[S. G. P.]

Dr. Perry.—The disk-cutters and mandrels were made for me by Lukens & Whittington, of Philadelphia.

I repeat that I want to give this gentleman, whoever he is, the credit which is due him, for from him, through Dr. Jarvie, I got this idea. The small disks and slender mandrels, however, are my own idea, and I again show them, not to claim credit for the manner of attaching the disk, but in order to show what beautiful finishing instruments they are when used without the nut, because, as the corkscrew does not project through the disk, its whole revolving surface can be held against the filling. Of course, the disks have to be specially made. I have them made in three sizes, and I have the three sizes of mandrels. Dr. Northrup asks how large a size can be used in these corkscrew mandrels. I use the largest size of disk sold in the market, and it seems to apply nearly as well as the smaller sizes by having the thread made coarser, and the mandrel larger, but a little more care must be taken in using the large ones, as they sometimes run off and might easily fly back into the throat. Time is saved by their use, but with the large ones, for one who operates with an attendant and can have a supply of disks held by a nut at hand, it may be doubted if there is much gain.

In making these, some very nice points are involved, which, if not regarded, will lead to failure. One must consider the thickness of the disk, its toughness, and the size of the hole, and the mandrel must be of the right size, and the corkscrew thread cut on it must be clean cut, and must increase in diameter with sufficient rapidity to bore its way into the paper or cloth, and yet keep the disk well centred.

Dr. B. C. Nash.—I remember to have seen exhibited at the State Dental Society, a year ago, an instrument designed for the same purpose as that shown by Dr. Perry. It was not of the corkscrew shape, but had a small button-like end with a pointed centre and a screw thread cut into it. With this instrument, while revolving, disks were readily picked up and disengaged at will.

The President.—As it was desired to give Professor Heitzmann all the time possible for his address at the last meeting, the discussion of the paper entitled "Treatment of Proximate Surfaces," which I read, was deferred until to-night. If there are any remarks to be made upon it, they will be in order at this time.

Dr. S. E. Davenport.—I was unable to be present at the last meeting, and therefore did not hear the paper referred to; but as I have had the pleasure of listening on many occasions to our presi-

dent's views on the treatment of proximate surfaces, I feel sure that I am right in commending the points to which he referred, and his manner of referring to them. This society is to be congratulated on having for its president the discoverer of cohesive gold, and the first to apply it to the restoration of the natural forms of the teeth. Essays from his pen are valuable indeed !

I have felt quite a little regret, ever since the evening Drs. Wilson and Winkler read papers on the same subject, that I did not place myself on record at that time in favor of contour fillings.

Drs. Allan and Jarvie led in the discussion of those papers, and while both gentlemen believe in the principles of contouring, they had most to say that evening in favor of flat gold fillings in the teeth of patients who are unable, either because of ill health or lack of means, to bear the fatigue or expense of large gold contour operations.

It is of such cases that I would speak particularly, and I take exception to the course of reasoning advanced by Drs. Allan and Jarvie, for several reasons.

I presume we all agree that any patient whom we accept is deserving of our best efforts. Why, then, should we deprive the invalid, or the patient with a light purse, of the gum-protecting, decay-preventing contour fillings ?

If we accept the principles of contouring in the abstract, is it not quite as necessary that food-crowding should be prevented in the invalid's mouth as in any other, and should we not in honesty make the class of fillings in the teeth of the patient with but moderate means which shall be most likely to prevent the recurrence of decay ?

For such cases, then, my creed is: Contour fillings ; material to be chosen according to circumstances.

I agree that in such mouths gold contours are usually out of the question ; but to me it seems better to change the material than to change the plan.

By the aid of matrices amalgam can be rapidly introduced and the contour accurately restored, a thin layer of gold for the biting surface attached by the Clapp method at the same sitting, or a gold edge or corner added at another sitting, enable us to use the alloys even where the cavity is near the front of the mouth.

In mouths where the zinc-phosphates have been tested and found to be fairly durable, I would contour with that material such teeth as I feared would be made unsightly by amalgam, not that I place much dependence upon the zinc-phosphates, but I am free to

confess that I would prefer such fillings well contoured with perhaps a layer of gutta-percha at the cervical margin to flat gold fillings no matter how perfectly made.

I should expect the zinc-phosphate fillings in any mouth not strongly alkaline to protect both teeth and gums better than flat gold fillings, and with less necessity for subsequent operations at or under the margin of the gum.

Dr. George S. Allan.—I speak feelingly on this subject, though I should have no reason for so doing, for I never wrote more honestly in my life than I did when I wrote my late paper. I was brought up on hard gold, as it were, on cohesive gold, and I have no idea of the time when I did not believe that the contour filling was the filling to adopt in all practical cases. Now, the question hinges on just this: What are the practical cases? I found, on looking around and watching, as far as possible, the operations of my fellow-dentists, that while every dentist of note and character wished to be put on record as adopting the contour principles, as a matter of fact the bulk of the practice of the day is on the line of the old face filling, and I thought there must be a reason for it.

I also noticed another fact,—that there were certain dentists, like Mr. Dunning, who had to stop work, unfortunately, some years ago, on account of failing eye-sight, who not only ignored the contour fillings, but, very strange to say, whose record for saving teeth was most excellent. In my paper I came out in words which could not be doubted by any one who could understand the English language, that I was a firm believer in the contour method of filling teeth, and that I even pushed things to an extreme, as I now do, to put in contour fillings; but they are not practical at all times. You all know the reasons. There are a great many reasons why the contour filling is not the filling to adopt at all times, in all places, and in all seasons. That paper of mine was misunderstood, and has been misrepresented in print. I am a firm believer in the contour filling system, and I practise according to my convictions.

I do not recollect what I said when Dr. Wilson read his paper. While I fully agree with Dr. Wilson,—and no one recognizes his ability more than I do,—I was perfectly conscious, at the same time, that while he was praising the contour filling and going over the old story with which we are all so familiar, he did not take the position that I wanted him to take, and which I knew he could take, namely, to point out some of the difficulties and how he managed to overcome them. I wanted him to tell us of some details that he had worked out, which would help us in that work. I never

intended going on record as favoring face fillings where contour work was possible.

I cannot make it plainer, it seems to me, than I do to night, that my meaning was misunderstood. Though I acknowledge that I was weary of this incessant ringing of the changes of the benefits of the contour filling, and not one word being given to the value of the face filling.

Dr. Perry.—A gentleman hands me this, which I will read :

“In restoring a tooth to its normal condition, if it were possible to replace the original tooth, you would do it, would you not? Of course you would, and so you would be justified in placing there its contoured counterpart.”

For a long time I have felt with Dr. Davenport, that in some of these cases, where contours are not practicable with gold, amalgam fillings would be justifiable.

I want to express a strong regret for ever having used copper amalgam. I think it will not only blacken the teeth, but blacken any man's reputation, and I think the sooner that is known and appreciated in the profession, the better it will be. Unfortunately, it is not a trait of human nature to profit by the experience of others. We like to learn for ourselves. I am commencing now to do over many of these fillings, which I put in two years ago. I have been doing them over for some time past. I have not wanted to be hasty in condemning this material, for I have seen many cases that are doing well, but it is too unreliable and we know too little about it to justify its indiscriminate use. Generally, it does not shrink, and it may have an antiseptic effect on the tooth; but unless it be in very delicate fissures in the crowns of back teeth, I do not know of any place where I should use it.

I have one little patient who has, I believe, forty or fifty little seams or imperfect fissures in the grinding surfaces of her bicuspsids and molars, which I have recently filled with copper amalgam; but the widest diameter of most of these would be only the size of the minimum burs, and here I expect it to do well. It does not seem to discolor the living part of a tooth so much, but when softened dentine is not removed, it is that which it discolors, and the substance of the dead tooth it will turn as black as midnight in a short time. I feel impelled to make this severe statement in reference to copper amalgam, because only recently a man long in practice, a member of this society, told me he had just commenced its use, and, knowing one must wait for two or three years to really know its effects, I thought it my duty to warn others as I warned him. It causes,

first, the discoloration of all dead substances of the tooth; in the next place, it wears away mechanically, evidently, on the surface, and it wastes away, on proximal surfaces, in a manner that suggests chemical solution. When it becomes necessary to remove such a filling, there is a more sensitive condition to contend with than when the cavity was first filled. When used for the purposes of contouring teeth, it takes but a year, or two years at the most, to allow so much waste from the fillings that food easily passes in between them, and the fillings have to be replaced.

Dr. Littig.—Have you found the same result with reference to buccal cavities?

Dr. Perry.—I think they would bear it better than other surfaces, because they are more exposed. I have seen some good results from its use, but it is unreliable, and I don't think we yet understand the conditions that will make it a success. It is nasty stuff anyhow, and I think we had better use it more sparingly than we have done.

Dr. Howe.—I am very glad that Dr. Perry has spoken on this subject. I have not used copper amalgam for over a year, and during that time I have spoken to several of my friends, expressing an unfavorable opinion of it. They have either replied, "You use it too stiff," or else, "You use it with too much mercury in it," or, "You do not mix it right." I have had some results which coincided with the favorable reports that have been made of it, but they were so few, as compared with the relatively large number of unfavorable results, that I do not consider it at all reliable. Its antiseptic properties have been dwelt upon very greatly, and what has been said has, no doubt, given many dentists the confidence they have in it. I suppose it has been proven to be a permanent antiseptic material, but I find that teeth will decay right alongside of fillings made with it. Zinc-phosphate fillings would seem to me to be more reliable, when they are used with judgment and the limitations of the material are recognized.

Dr. Allan.—I think Dr. Davenport hit the key-note. There are a great many cases where a good amalgam filling is vastly better than a face filling. I do not think that an oxyphosphate filling has substance, solidity, and strength enough to stand as a contour filling; but certainly amalgam oftentimes acts admirably. One of the difficulties we encounter arises from the fact that sufficient care is not taken to pack the amalgam solidly from the foundation. It will take time to put in a good amalgam filling. The rubber has to be applied with much care, the cavity shaped, and the amalgam packed, not in a huge mass, but in a dry powder, with

as little mercury as possible, and built up pellet by pellet. The rubber should not be pulled off, as where gold has been used, but be cut away with the greatest care, so as not to take the risk of displacing any of the amalgam at the neck of the tooth.

Dr. George Evans.—I think it is universally acknowledged by the profession that contour work is the proper form; but when these papers are discussed, this line of argument is generally taken: "As a rule, contour work is the best," always leaving the impression that there are cases in which it is not practicable. Those are the cases which we want to get at. If the gentlemen would present a list of conditions in which contour work would not be advisable, I think we would very quickly get at what we aim.

Dr. Allan.—Two weeks ago, last Sunday, I sadly looked upon the face of one of my oldest and dearest friends, as he lay in his coffin, in the house that he had occupied ever since he came to New York. As a boy I knew him in Cleveland, and probably there are few here who knew him as intimately and through as many years as I have, who have known both his social and professional life. I allude, as you all know, to our late friend, Wm. H. Atkinson, a man brought up under many disadvantages (he was born in the wilds of Western Pennsylvania) and in the greatest poverty, but by the force of his intellect, and his intellect only, for he never had the chance while a boy of acquiring an education, he had made himself a name which was known the world over.

No man ever lived who worked more fully, heartily, earnestly for his profession than Dr. Atkinson. Whatever may have been his faults, he was true to his profession and true to his brother practitioners. I think it but right, then,—in fact, it is our bounden duty,—to take some fitting action, while his memory is yet green with us, to put upon record what we, as a society, think and feel, and wish others to think and feel with us, respecting Dr. Atkinson.

I therefore call upon the chair, with the permission of the Society, or its acquiescence, to appoint a committee of three to take proper action in this matter.

The President.—The chair appoints as that committee, Drs. George S. Allan, Benjamin Lord, and A. L. Northrup, the report to be made at the next meeting.

Dr. Northrup.—I beg to move that the president of the Society be added to the committee.

Motion carried.

The President.—Since last we met, a prophet has fallen from our midst, and we are left bereaved and desolate.

We have met with a loss that can never be repaired.

There was but one Atkinson, and there can never be another.

He was a man of rare acquirements and rare ability of expression; at times he seemed to us like one *inspired*!

It is a matter of congratulation to us that his *last* effort was here, at the last meeting of our Society, when he reviewed the lecture of his friend Heitzmann before us.

The work he instituted here will go on, and though he be dead, yet shall he *speak* to us continually.

Let it be our duty to perpetuate his memory in this *direction*.

I understand that a movement is already on foot to this end, to, in some way, institute an *Atkinson Educational Memorial*, which I am sure will meet with the approval of all who knew him.

“ He was a man, take him for all in all,
We shall not look upon his like again.”

The essayist of the evening, G. L. Curtis, M.D., D.D.S., was then introduced, who read a paper entitled “A Cursory Glance at Tetanus.”

(For Dr. Curtis's paper, see page 438.)

Dr. Northrup.—I move a vote of thanks to Dr. Curtis for his very able paper read before us this evening.

Carried.

The President.—The subject of Dr. Curtis's paper is now open for discussion.

Dr. George W. Weld.—I would like to ask Dr. Curtis whether the bacillus, such as he described, has been isolated.

Dr. Curtis.—It has. I have been able to secure the bacillus in a case of tetanus, and have seen it through the microscope, and it has been isolated by many others. Physicians say that some times the stretching of the principal nerve is beneficial where a person has tetanus. It seems to me that there is a little difficulty just here. If the bacillus peculiar to tetanus has been recognized, it does not seem to me that the stretching of the nerve would have anything to do with relieving the patient.

Dr. Perry.—I would like to ask Dr. Curtis if I understood him that cases of tetanus have occurred from the replanting of teeth since the modern methods were applied, which of course are anti-septic.

Dr. Curtis.—I have stated that cases have been observed in transplanting teeth, not in replanting them. That was about

twelve years ago, in Philadelphia. A dentist there transplanted a tooth, and the patient died of tetanus. There are other cases on record, I believe.

Dr. Northrup.—Was there not some question whether that case you refer to was tetanus or not?

Dr. Curtis.—I have not seen any written statement. I got my information from Dr. Garretson.

Dr. Perry.—I have heard repeatedly that it was not by any means an undisputed case of tetanus.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,
Editor New York Odontological Society.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular monthly meeting of the American Academy of Dental Science was held in the Boston Medical Library Association rooms on March 4, 1891. President Seabury in the chair.

The paper for the evening was read by Lewis S. Dixon, M.D. Subject, "Proper Care of the Eyesight."

(For Dr. Dixon's paper, see page 423.)

DISCUSSION.

Dr. Williams.—I wish to express my gratification for the privilege of listening to a paper so scientific, and yet so plainly expressed. The subject is one of great importance to us all, and, though I have not made an especial study of it, the principles referred to by the speaker seem to me perfectly sound. The essayist, speaking of rest and intermittent rest, reminds me of a remark that I heard Dr. John C. Warren make when he was professor of anatomy, in 1844, to the class in which I was a student. He said, "When you are doing an operation lasting for half an hour or more, the eyes will sometimes become blurred as a result of close application, and it may be difficult to see without making an extra effort. At such a time you may do harm by forcing the eyes, and it is better to let them rest on some other object for a brief period, or step to the window and look out for a moment or two. In this way the eyes are refreshed, and you can see as well as ever, and by constantly observing this rule there is no danger of exhausting them." The essayist has embodied that principle in his paper, and shown us that

rest must alternate with work in order to gain or keep strength. This has proved an invaluable principle to me. Whenever my eyes become tired, not exhausted, I let them rest for a minute on a distant object.

With regard to light reflected into the eyes, we certainly expose ourselves to many disadvantages from light-colored objects and polished metal surfaces. As the essayist says, the light should not enter the eye, but should be a little above and at the back of the operator, in order that he may work with the least effort. Dr. B. S. Codman told me some years ago that he was obliged to give up the practice of dentistry because he found that looking at white teeth seriously affected his eyes. Whether or not that was the first cause, it showed the fact that a constant use of the eyes upon light objects does affect the sight. Some dentists and surgeons wear white operating coats which reflect the light which strikes them, and have about the same effect as a snow-bank under their eyes. Polished metal surfaces and white napkins are likewise to be avoided. We should have the latter shaded a little, so that the light will fall upon the object you are operating on, and not be reflected into the eye.

Dr. Potter.—If I understood Dr. Dixon, he recommended the incandescent as superior to any artificial form of light that we have, and I would like to ask him how the incandescent lights can best be prepared,—whether the ordinary fixture, the plain pear-shaped bulb, is proper for either reading or working, or whether that is too bright? It seems to me that there is too much glare, and that the bulb ought to be surrounded with a ground-glass case in order to take off the brilliancy. It has always been my impression that the pear-shaped globe was rather more trying than some gas-lights.

Dr. Dixon.—The principal point is to so place the bulb that, as you work or read, you cannot see the filament. If it is above or back of you, or placed in any way so that direct rays from the filament do not strike the eye, then the more light you get, the better. It is the direct light from the illuminated source that annoys.

Dr. Williams.—Another point occurred to me, and that is the use of lenses to which the essayist refers. I was taught as a pupil not to imagine that my eyes were microscopes, but to take advantage of the use of the magnifying-glass for looking at small things, just as jewellers, watchmakers, and engravers do, and I always carry a small magnifying-glass with me. I have often operated with a lens on my finger, as an engraver does, and have found its use to

be of great service to me. There are aids which civilization affords us, and if we adopt them we certainly have the gain. The young Alpine tourist, in going up the mountain, will always take with him his mountain staff, even if his muscles are all strong and sturdy. That idea of working under magnifying power I once saw put into practical operation by a dentist who used a stand which supported a large, round magnifying-glass, through which he looked into the mouth of the patient and worked as an engraver does. He was formerly an engraver, and after becoming a dentist, and trying for some time to get along without a glass, he was satisfied that he could not do as good work without it. Students should be taught to use a lens, and so improve the quality of their work.

President Seabury.—I was advised, when a young man, to use glasses as soon as I found they would help me, and, realizing the necessity of clear sight in my profession, I resolved never to let my sensitiveness override my needs. The person who advised me said, "Don't wait until you are forced to wear glasses, but put them on as soon as they will help your eyes. Then your eyesight will last longer than if you delay till there is an absolute necessity." I have with me to-night my working-glasses, the upper third of which is cut off so that I look through them only when I look down at my work. When I look up I use my natural sight. This arrangement of my glasses involves the principle of alternate rest and use, about which the essayist has spoken, and is very satisfactory to me.

Dr. Werner.—The lesson we derive from the essay of this evening is, that we cannot be too careful of our eyesight. To me it is very plain why the average practitioner finds it necessary to use glasses at such an early period of life. Among the causes, as Dr. Williams has suggested, are the bright materials with which we work and are surrounded,—as, for instance, light operating coats, polished and shiny metallic surfaces on our apparatus, the white surfaces of the teeth. These things demand a constant nervous and muscular co-ordination of the eye. Besides, some dentists read at all times and in all lights, even when travelling on railway trains and horse-cars. Every dentist should have a distant outlook from his operating-room, so that the eye may be turned from the near work and rested on a far-away object. We dentists live in small, ill-ventilated operating-rooms for a considerable portion of our lives, and hence it is that so often dentists look pale and haggard, lacking the bright, rosy color of the physically healthy man. Physiologists tell us that the exhalations from the lungs

contain a product of decomposition that when reinhaled is very poisonous to all animal life; that it will kill in a very short time, even coming from healthy lungs. How much worse its effect when coming through mouths that are diseased and ill-smelling! We need large operating-rooms with ventilation through a fireplace and windows so as not to live in an atmosphere of exhalations.

Dr. Taft.—I should like to ask the essayist if, in his opinion, a fatigued condition of the system brings about a dimness of vision in the hypermetropic eye quicker than in the presbyopic, and in what condition of life dimness would be most apt to manifest itself? I seldom feel any fatigue myself, although I use my eyes very constantly, and work, perhaps, as little with the mirror as almost any man. I know it is not a good thing to do, and have thought that, while feeling but little fatigue, perhaps by the continued strain upon the eyes I may be abusing them.

Dr. Dixon.—In simple presbyopia the fatigue is felt only after the age of forty, and it then manifests itself by a dimness of the vision or weariness when engaged in near work. If one does not tax the eyes too much, no serious trouble may be looked for. But in hypermetropia the person is, of necessity, under constant fatigue. As long as his nervous system is able to bear it he may continue using his eyes without noticing any trouble, until some extra demand on, or decrease of, his nervous power makes the defect become prominent. People of sound constitution may have hypermetropia all their lives without inconvenience, and it only comes to their knowledge by having the distant vision fail somewhat when over fifty. All those people who can accept a convex glass and see better with it at a distance have been hypermetropic all their lives; and if they had known it they could have saved their eyes a great deal of unnecessary labor.

In regard to reading in the cars, the only point to remark is this: a normal eye will stand almost any amount of work without becoming fatigued. It is the imperfect eye that gives out. A perfect eye can read in the cars a good deal without serious fatigue or strain; it is able to bear it, though I do not wish to be understood as recommending this practice, for we are not all blessed with perfect eyes, and one might attempt to use an eye with an error so slight that it would be very difficult to find, but which nevertheless would soon give out. As I stated in my paper, the astigmatic eye and the hypermetropic eye never have any rest except when the eyes are closed, and it is the never-ceasing work which they are compelled to do that is at the bottom of the whole trouble.

Dr. Harris.—I would make a motion that the thanks of the Academy be extended to Dr. Dixon for the very interesting and valuable paper which he has read before the Academy this evening.

Dr. Fillebrown.—I second the motion. I have made no remarks upon the paper, though I have thoroughly appreciated its excellence, and I have learned a great deal more about a pair of eyes that has done good work for a great many years than I ever knew before.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

NEW JERSEY STATE DENTAL SOCIETY.—TWENTIETH ANNUAL SESSION.

(Continued from page 406.)

Thursday, July 17, 1890.—Evening Session.

THE Secretary called the roll.

The election of officers was then proceeded with.

The following officers were elected:

George Emery Adams, D.D.S., President; B. F. Luckey, D.D.S. Vice-President; Charles A. Meeker, D.D.S., Secretary; George C. Brown, D.D.S., Treasurer.

Executive Committee.—B. F. Luckey, D.D.S., Dr. Oscar Adelberg R. M. Sanger, D.D.S., C. W. F. Holbrook, D.D.S., S. C. G. Watkins, D.D.S.

State Board of Examination and Registration in Dentistry.—Frederick A. Levy, D.D.S., G. Carleton Brown, D.D.S., F. C. Barlow, D.D.S., E. M. Beesley, D.D.S., A. R. Eaton, D.D.S.

Committee on Membership.—J. W. Curtis, D.D.S., Dr. J. A. Osmun, Dr. J. L. Crater, I. M. Vandewater, D.D.S., W. E. Truex, D.D.S.

Dr. John S. Marshall, of Chicago, Ill., was then called upon to read his paper on "Aneurismal Tumor of the Right Alveolar Process," etc.

(For Dr. Marshall's paper, see page 367.)

Dr. Palmer.—I want to express, as a member of the New Jersey State Association, my personal gratification and satisfaction at having had the pleasure of listening to Dr. Marshall's paper. I am not in a position to discuss such a paper; indeed, it is hardly one that admits of discussion, but as a member of this Society I desire to express my personal thanks to Dr. Marshall, and I believe I express the sentiment of a number of others.

Dr. Peirce.—The paper of Dr. Marshall very clearly states the conditions and the results, but does not admit of very much discussion. I have had great pleasure in listening to it, as we all must have had.

On motion, the paper was passed.

Dr. Charles B. Atkinson then read his paper on "Prophylaxis in the Field of the Dental Surgeon."

(For Dr. Atkinson's paper, see page 371.)

Adjourned until Friday, July 18, 1891, at 10 o'clock A.M.

Friday, July 18, 1891.—Morning Session.

Dr. B. F. Luckey presented the following report from the Clinic Committee:

Dr. L. M. Warner representing Dr. George Evans, of New York, inserted two of Dr. Evans's seamless gold crowns; one, an ordinary superior bicuspid, the other, an adjoining molar in which decay had penetrated chiefly below the gum line; the loss of tissue at that point was restored by building up with amalgam so as to make a solid foundation for the attachment of the crown. Dr. Seymour inserted a gold filling for the benefit of the Board of Examiners. Dr. Sanger, of Orange, very beautifully and very quickly inserted a Logan crown, and Dr. Z. T. Sailer, of New York, exhibited a split pin crown and some instruments of his own designing for the fitting and adaptation of the collars to the necks of the teeth. Dr. W. P. Richards, of Orange, also inserted a filling. Dr. Faught, of Philadelphia, who was to exhibit his electrical instrument for the insertion of gutta-percha into the roots of teeth, was unable to do so because a portion of the apparatus was damaged, and Dr. Adelberg, of Elizabeth, inserted an amalgam filling.

Dr. Adams, of the Exhibit Committee, reported as follows:

Your committee has done its best to have the exhibits a credit to the Society, and while not as successful as was the same committee last year, yet they have done all they could. There have been eleven exhibitors, and there were several other applications for information concerning space, all of which were responded to, and there were some who expressed an intention of exhibiting who did not do so.

Dr. C. W. F. Holbrook.—The Committee on Crown- and Bridge-work have nothing of importance to report, but they heartily endorse the crown- and bridge-work, more particularly in small cases. Dr. Bonwill presented some very interesting exhibits; they were a little out of the line of bridge-work proper, but they served

very nicely to take the place of bridge-work. They were small gold plates and are highly recommended by the committee.

The Committee on Materia Medica, through Dr. Luckey, chairman, stated that they had no report.

The President then called up the further discussion of Dr. Atkinson's paper.

DISCUSSION OF DR. ATKINSON'S PAPER ON "PROPHYLAXIS IN THE FIELD OF THE DENTAL SURGEON."

Dr. W. S. Elliott.—Following the suggestions of the essayist in such order as may be possible, we observe, first, the education of the mother in relation to her own health and that of her offspring. Here we admit the supreme importance of the subject, and it is here that the most advanced claims come to be asserted in the possibilities of prevention rather than of cure.

To lay the foundation of perfect tooth-structure, the mother should take cognizance of the faults of her own nature and be able through a proper *régime* to redeem those faults in the more perfect organization of her children. The field of observation is a broad one, and were it covered by true knowledge of requirements little need would there be for professional interference; but the circumstances of modern life—the inevitable struggle for existence—preclude the possibility of attaining to any but a moderate degree of acquisition, therefore authoritative advice and direction may not be undesirable or unheeded. The danger of over-specification is, however, to be guarded against, since rules of limitation in diet and environment may not infrequently fall short of that consummation which natural desire would more perfectly attain to. Living by rule tends to strongly concentrate the thoughts upon one's self, which makes life an artificial one and warps the sentiments and affections of one's nature. While moderate discrimination in the selection of food is proper, we would lay much stress upon mental influences of the mother in shaping the destiny of the new life. Impressive as is the foetus *in utero*, care should be taken that the current of vital energy be not diminished or deflected to result in deformity or incompleteness. The higher qualities and affections of the mind, then, we would claim, are powerful agents to the production of a status of physical being to which we would aspire as our most exalted ideal. The body is largely a reflection of the mind, therefore we would hold that right-mindedness gives right bodiedness. To be whole is to be holy. Live the higher life. Drink to the soul of truth. "Be clean" is the common injunction appli-

cable to all, whether in reference to habits of mind or to habits of body, and we can favor no higher law than this as of universal application.

Aside from these general indications and such as fall more especially to the province of the practical dentist is the immediate care of the teeth. The injunction here is of paramount importance, and if religiously observed little more need be done towards a complete prophylaxis. Special instruction in this direction is legitimate as facilitating the effort, and in correspondence with the later understanding of dental pathology we would modify our formulæ for tooth-powders, washes, etc. The brush is indispensable, but allow me to pass sentence against that most disgusting substitute, the felt brush; reeking with the filth of putrefaction, it is certainly unfit for the purpose recommended. An acceptable powder is composed of precipitated chalk, soap, tannin, salicylic acid, and sugar, with flavor to suit the taste. For an antiseptic wash we would recommend a solution of Carl Sieler's tablets. This has an alkaline reaction, and, being antiseptic, is highly preservative of a normal condition.

Preventive measures are not the less called for under conditions of infraction; but now restoration takes the first place, and after the attainment of possibilities in this direction the same foregoing rules of prophylaxis are to be observed for the maintenance of the restored conditions. But restoration implies not only the repair of the teeth through direct operative and medical effort, but the intelligent meeting of contingencies which interfere with systemic wholeness. The dentist should be a physician in all that the title implies, that he may at least take cognizance and make due estimate of outlying needs to further his more immediate aims.

In this respect the points referred to by the essayist may be deemed too remote and too numerous to be entered upon by the practical dentist, and as not being "within the field of the dental surgeon." Should, however, a more extended knowledge of dietetics be desired, we would refer to statistics of scientific demonstrations, emanating from our public institutions, showing the relations existing between food and physical development, the details of which would outreach the limits of this debate.

In connection with this, as important for consideration, is that of atmospheric influence. The well-recognized fact that impure air is the causative agent of many maladies, especially as occurring among children, would lead us to impart instruction to our patients as regards ventilation and the practice of disinfection. All this

costs no more than the desire to do our highest duty, and to augment the welfare of those who would confide in our knowledge and judgment. This applies also to clothing, exercise, sleep, occupation, and general habits of life. Scientific direction in each implies a reasonable understanding covered by the curriculum of studies easily within the reach of all who would claim distinction as dental scientists.

Should the executant feel indisposed to encroach upon the field of the general practitioner in the treatment and care of systemic ailments, he cannot with consistency ignore the topical and general treatment of lesions of the mouth that fall under the head of oral surgery; and when he understands and realizes what are the sympathies and mutual relationship that exist between the teeth and other organs of the body, then will he the more fully appreciate the importance of a general as well as a topical prophylaxis. While the tendency is ever to specialize, yet a moderate breadth of attainment will enable him, at least, to admonish where admonition will be heeded; urge moderation where excess is apparent, and abstinence where judgment approves.

Thorough mastication is a most important factor in prophylaxis. It has a double significance in that it promotes perfect digestion and assimilation and imparts functional energy to the teeth, gums, and salivary glands. The evils arising from inattention to this physiological necessity is ever apparent in the depreciated standard of health of a large proportion of adults. We believe that this habit of neglect is largely due to the practice of continuing the administration of soft and pulpy food to children beyond the period when the young teeth should have vigorous exercise. It is scarcely to be wondered at that teeth are lost and health diminished under such adverse conditions.

The insertion of artificial substitutes in cases of loss of the natural organs is in strict compliance with the demands of prophylaxis, since not only is mastication more completely accomplished, but the functioning of the retained teeth is qualified to the standard of natural requirement. But here, as in the operation of filling or the application of therapeutic remedies, the highest skill and judgment is demanded that destructive elements may not enter where preservation is desired.

We cordially endorse the injunction laid upon the habit of the repeated use of instruments without thorough cleansing. We recognize no greater sin of practice than this, and be assured it is not a mere sentiment, for facts of observation have shown repeatedly

that diseased conditions have arisen through contact of soiled instruments, especially noticed in cases of extraction and with a class of patients who are more commonly patrons of this department. It is my custom to dip the instruments into carbolyzed water prior to and after using, wiping them dry with chamois. Hot water, doubtless, is quite as efficient; but whatsoever method is adopted, keep ever this high injunction before the mind,—be clean.

There being no further speakers on the subject, on motion, the paper was passed.

The installation of officers was then proceeded with.

On motion, the following vote of thanks was passed:

Resolved, That the thanks of this Society be extended to Mr. James A. Bradley for his interest in this Society, and for placing tables, etc., at the disposal of the Executive Committee.

On motion, the following were also passed:

To the essayists who have attended the present meeting and read papers.

To the proprietor of the Coleman House and the exhibitors.

To the press for their endeavors to report the proceedings so faithfully (this resolution was responded to by Mr. Ross, of the *Asbury Park Journal*).

To the Legislative Committee for their efforts and kindness in securing the passage of the present law.

Adjourned *sine die*.

CHARLES A. MEEKER, D.D.S.,
Secretary.

PENNSYLVANIA STATE DENTAL SOCIETY.

(Continued from page 407.)

DISCUSSION OF DR. FAUGHT'S PAPER ON "THE RELATION BETWEEN DENTAL CARIES AND DIET."

(FOR Dr. Faught's paper, see page 448.)

Dr. Leffmann said he has been for some years a convert to the theory of micro-organisms; he has come to the conclusion that bacilli are the origin of the destructive process known as caries of the teeth. Nevertheless, the possible effect of constitutional causes, of nervous derangements must not be lost sight of.

Micro-organisms produce chemical compounds which, doubtless, exert a local deleterious influence on the teeth, but they are perhaps

not wholly to blame. As to diet, he cited the fact that while an article of food may be high in nitrogen, it need not necessarily, on that account, be the most nutritious, because the nitrogen may not be given up for proper assimilation by the digestive apparatus. Mushroom and oatmeal were given as examples, the former being highly nitrogenous, yet generally acknowledged to be lacking in nutritious qualities, while others less nitrogenous are more beneficial.

Dr. Gerhart said while he has no fault to find with the theories advanced by both the essayist and Dr. Leffmann, yet, on one point, he must take exception to them, and that is that micro-organisms are responsible for the effect of decay of the teeth. All things are the results of certain laws. Our functions are due to, and developed by, our environments; and when the conditions to which we have become adapted are deranged, our systems will suffer accordingly. When the teeth perform their intended functions they will resist the influences which tend to their destruction. This point the speaker illustrated by reference to certain tribes of the Sandwich Islands, who formed an exception to the rule of savages generally, in that, instead of eating their food in a raw state they cooked it. Consequently, as an examination of their skulls showed, their teeth decayed, and were attacked by all the diseases which those of civilized nations suffer, while neighboring tribes, who know not the art of cooking, seem to be exempt from diseases of their dental organs.

Dr. C. S. Beck said he does not believe in the direct influence of modes of life. An examination of ancient skulls in the Academy of Natural Sciences of Philadelphia will show teeth as variable in states of preservation and decay as those of to-day. Evidences are found in these old specimens of the existence of all the diseases to which teeth of our age are subject, such as decay, alveolar abscess, abrasion, erosion, etc. He believes oatmeal to be rather injurious than beneficial to the teeth by its effect upon the system. The manner of taking our food rather than the kind of food we eat he believes to be responsible for the poor condition of our teeth. As a nation we are too busy, and do not devote sufficient time to eating. In support of the claim that Americans have poorer teeth than representatives of other civilized nations, the speaker cited the alleged fact that the latter often have good teeth until they come to live among us, when their teeth commence to deteriorate. This, he said, he has seen illustrated in the cases of Irish servant girls.

Dr. Joseph R. C. Ward said his experience is that representatives of other countries, notably the Irish, whom Dr. Beck referred to as having good teeth, have no better teeth than Americans. The case

of his own servant and others bear him out in this conclusion. He also spoke of the corrective influence of acid food in the extensive accumulation of lime-salts upon the teeth.

Dr. Beck asked Dr. Leffmann for his opinion as to the influence of oatmeal and other cereals upon the teeth. Dr. Leffmann, replying to Dr. Beck, said that, in his opinion, oatmeal and like cereals are overrated as vehicles for supplying the system with needed lime-salts. People who use them habitually are often found to have poor teeth. In support of the oatmeal theory, the Scotch people, who use it largely as an article of diet, are often held up as giving evidence, by the soundness of their teeth, of its value in this direction. But in answer to this argument the fact might be urged that they are also liberal consumers of spirituous liquors. Would it be any less logical, then, to attribute the preservation of their dental apparatus to the use of whiskey?

Dr. Fordham, in speaking of the supposed influence of oatmeal, cited the case of his own family, who, by his direction, have always used oatmeal, and yet the teeth of his own children, six in number, are more carious than those of any other of his patients of the same ages.

Dr. L. Jack asked Dr. Leffmann as to the possible eventual neutralizing effects of slight alkaline salivary conditions, and, on the other hand, of the possible promotive influence in the production of bacteria of a slightly acid condition of the saliva, and then referred to the deleterious influence in the promotion of caries in the cases of descendants of native Indians after their admixture by marriage with Caucasians.

Dr. Leffmann said that bacteria produced acid up to a certain point, at which the acid they produce will result in their own destruction. He also further explained the germ theory.

Dr. Beck cited the case of a patient, a boy sixteen years of age, of an extremely nervous temperament, and whose teeth are so persistently carious that no treatment has any effect. Constitutional treatment and travel are alike futile. His nervous condition is such that the least possible excitement creates intense disturbance and shock.

Dr. Leffmann, speaking of nervous impressions, related the case of a mother who was so much shocked by seeing a window-sash fall upon her child's hand that shortly afterwards a very perceptible irritation appeared on her own hand,—swelling and discoloring to correspond with the injury received by the child.

On motion, subject passed.

DISCUSSION OF DR. EISENBREY'S PAPER ON "IRREGULARITIES."

(For Dr. Eisenbrey's paper, see page 444.)

Dr. A. Boice illustrated on a black-board the application of a gold band in the treatment of irregularities, and urged the importance of using silk ligatures applied dry and tightly, as recommended by the essayist.

Dr. C. S. Beck exhibited models of a case spoken of before the Society a year or so ago. He brings these models to the Society's notice, he said, to show, by the results, the folly of practitioners both in diagnosis and prognosis, and then explained his method of procedure with bands, ligatures, and jack-screws in the case illustrated.

Dr. J. A. Libbey said that he was not present at the meeting referred to by Dr. Beck, but thinks the models exhibited show that the diagnosis was correct. He called attention to the danger of beginning treatment too early, and related a personal experience in bringing into place the lateral incisors of a young subject, in which the result was absorption of the roots, necessitating, of course, their extraction.

Dr. L. Jack, speaking of the too early treatment for irregularities, said that great harm may result by the premature closure of the apical foramen.

Dr. H. E. Roberts spoke of the difficulty experienced in inducing children to submit to treatment before they are old enough to appreciate the end sought.

Dr. W. H. Fundenberg considered it a very difficult matter to express an opinion from the mere observation of models. It is necessary in most cases to see the patient in order to get a full understanding of the case. The objection to Dr. Eisenbrey's ligatures is the endurance required in patients of tender years in the adjustment and wearing of such delicate appliances. The doctor cited a case in practice illustrating his method of procedure, which is opposed to ligatures, gold-bands, etc., that cannot be removed by the patient for the purpose of cleansing.

Dr. Ward pleads guilty to the charge of extracting teeth in regulating, and does not consider it a heinous offence either; believes it better in cases of extreme malposition to extract than to force such teeth into already crowded arches, and differs with the essayist, Dr. Beck, and others in the length of time required. He cannot conceive of a case requiring as much as a year to complete it.

Subject passed.

HARVARD ODONTOLOGICAL SOCIETY.

THE Harvard Odontological Society held its regular monthly meeting December 31, 1890, at Young's Hotel, Boston. President Cooke in the chair.

The paper for the evening was by J. G. W. Werner, D.M.D. Subject, "A Case in Practice."¹

(For Dr. Werner's paper, see page 105.)

Dr. Hitchcock.—Dr. Werner has given such a full account of this case that there is little for me to add. In the paper which he read to-night he spoke of the lady having a chill on the third day. Had I known this at the time, I should have refused to take it, knowing it indicated septicæmia. I think it was the second time I saw her that she spoke of having the chill. Gave her quinine, telling her that if another occurred to commence using it at once.

The chief causes of these imprisoned teeth are the want of the necessary space for proper eruption, retarded evolution, striking against teeth, and retarded absorption.

We find the first trace of the third molar at twelve years of age, so it is six years in forming and getting into line, and this at the age when there is a special drain on the system. Magitot says, "There is perhaps no organ which yields to the influence of the general condition of the constitution and the change of health more easily than the teeth." The third molar is the tooth which is most likely to be imprisoned,—the inferior oftener than the superior. Next in frequency are the cuspids. These are sometimes revealed by their being partially uncovered through a process of alveolar absorption late in life. As the fourth molar is almost entirely extinct in this generation, so the third molar will undoubtedly be generations hence, as even now the arch is much contracted. Teeth far away from the alveolar arch are quite rare, and when found, are generally encysted. According to Dr. Bolles, the third molars most frequently exhibit this anomaly; next in frequency are the cuspids. Sayre relates a case of a little girl under his care who had three molars separately ejected through the meatus auditorius externus. That the third molar causes a vast amount of trouble is known to us all, simply its eruption often causing serious illness. Esquinol reports the case of a woman who recovered from insanity

¹ The paper of Dr. Werner should have been followed in the same number by this discussion; but the latter was not received until June. The subject of the paper was a "Case of Impaction of the Third Molar."—[Ed.]

after a crucial incision was made in the gum to promote the eruption of the third molar. Also, three cases of mania in young girls, which only disappeared after the eruption of retarded teeth. M. Vellerix records the case of a young girl of strong constitution and previous good health who had so much irritation and inflammation from the simultaneous eruption of third molars at the angle of the jaw that nausea and irritability of the stomach set in, followed by vomiting, strabismus, convulsions, and death. Lancing had no effect. Dr. Salter relates a case of paralysis of the arm caused by the third molar. Uterine affections, retarded labor, impeded healing of wounds and ulcers, headaches, hip-diseases, and many other disturbances are cited as caused by the teeth.

The question arises, How far are we as dentists to proceed in such operations? Many of those done by the surgeon could have been accomplished with far less cutting, and really making a minor operation out of what is sometimes considered by the surgeons to be a very complicated one. I saw a case a few weeks ago where a bony tumor, one and one-half inches long by one wide, was removed from the superior maxilla by a dentist, he simply making an incision in the gum and the soft parts along the alveolar ridge, removing the tumor from the inside. The patient was sent to the hospital where the surgeon was to cut, beginning on the outside of the face, then go through the jaw, and take out a good-sized piece of that in order to remove the tumor. The operation by the dentist was a minor one, a very serious one if performed by the surgeon, and as a result, of great importance, the leaving of no visible scar.

I had a case in my own practice of necrosis of the palatal bone, it being involved to the extent of about the size of a five-cent piece. On making a thorough examination, I found there was necrosis, and with the assistance of a surgeon (whom I supposed would perform the operation) she was etherized. I had brought my dental engine, thinking it might be of service. After the patient was etherized the surgeon told me to proceed. This surprised me, as I had not the remotest idea that I was to do anything more than to assist. The operation required about half an hour, a fair-sized portion of the palatal bone being removed. The wound was treated regularly and healed very nicely. About three years afterwards, I found the trouble was recurring again slightly. My impression, when first operating upon the case, was that it was caused by an ill-fitting plate which the lady wore, and a new plate was made which was free from friction, and was therefore puzzled on seeing the trouble reappear. In a short time a cuspid tooth which had

been imprisoned erupted. With the removal of this tooth the lesion entirely disappeared.

The dentist has the advantage of the surgeon in that he has, or should have, a nicety of touch that will tell him what he is in contact with without seeing it, and whether it is entirely removed. In cases of necrosis a small opening may be made, and the engine-bur will remove the diseased bone far better than scraper and chisel. But suppose we sever the nerve, and paralysis follows? If in a surgeon's hand, probably little blame would be attached; it would count as a sequence of the operation; but in our hands, the operation being considered a minor one, we are judged accordingly. How far should we go?

Dr. Clapp.—This is a very interesting case,—we are all liable to get such. I do not quite understand the description of the treatment, and would like to ask Dr. Werner if he considered, when he removed this tooth, that he had removed all the cause of the difficulty at that time?

Dr. Werner.—We did not think we had finished the operation by simply removing the tooth, though we considered that to be the cause of the lesion, but after exploring with probe, scraping roughened surfaces of bone, and thoroughly cleansing the cavity, we expected the case to get well, provided the orifice were kept open, the cavity syringed and kept in an aseptic condition, allowing it to heal only from the bottom.

Dr. Clapp.—With me the question would have been in regard to the after-treatment, the advisability of keeping the opening packed with cotton. It seems to me there was no question but that the cause of the difficulty was this impacted tooth, and that the presence of the cotton, under these circumstances, would be rather a detriment to the healing up of the wound. If it had not been packed, the opening would not have closed for some little time, and a simple drainage-tube could have been put in without causing any irritation, and there would have been less liability to septicæmia. I do not wish to be understood that I desire to criticise the treatment of the case, but if the case had been in my hands, I should have left the cotton out.

Another thing occurs to me. From his paper I understand that the gentleman thought he was removing a supernumerary tooth. In my opinion this is not a supernumerary tooth, but a retarded third molar.

Dr. Hitchcock.—As far as the drainage-tube was concerned, the cotton was not packed so that the orifice was completely closed. It

was simply dipped in this solution and placed there loosely, keeping it sweet and clean. Being treated in this way, the wound had all the advantages of capillary attraction that it would have if a drainage-tube had been inserted. If the cotton had been packed in tightly, of course it would not have allowed the wound to heal.

Dr. Clapp.—The difference would have been the irritating qualities of the cotton. I have had several cases of large cavities caused by breaking down of the arch, with formation of pus, both in the superior and inferior maxillæ, and I have been afraid of overtreating, fearing they would, if I treated them every day or every other day, sufficiently to cause a fresh wound over the whole surface, be very much slower in healing. By too frequent treatment the granulation that is going on is broken up and the healing is much retarded. That is the theory that I have acted upon. I have found that by infrequent treatment, but keeping the orifice open, much better results are attained.

Impacted teeth—teeth that have failed to present themselves at the proper time—are not very uncommon. They are often there without causing much trouble. Many years ago, when I first began practice here in Boston,—it was probably in 1871 or 1872,—I extracted a badly-decayed superior right lateral for an elderly lady, and I supposed from the appearance that I had broken the tooth. I afterwards took, or tried to take, out what I supposed to be the remainder of the tooth. After considerable trouble, I succeeded in extracting as handsome a cuspid tooth as I have ever seen.

This month I had occasion to examine a patient's mouth, a gentleman who is probably between fifty-five and sixty, who has been wearing a lower denture. By chance I discovered in the right inferior jaw, near the distal portion, a little point that appeared to cover a root of a tooth. The gums in the lower part of the mouth seemed to be almost entirely healthy, and it was by accident that I noticed this little point, and I took up a probe to see if there was a root there. You can imagine my astonishment when I found what was no doubt a wisdom tooth. It was giving him no trouble, and I did not propose extraction to him. It is my opinion that the left inferior wisdom tooth is there also.

Dr. Briggs.—I would like to ask Dr. Werner what he considers this large fragment to be?

Dr. Werner.—I am in doubt. It is difficult to tell whether it is a portion of the maxilla, the sphenoid, or the palate bone.

Dr. Briggs.—It looks to me very much like the two roots of a bicuspid.

Dr. Smith.—That is what suggested itself to me.

President Cooke.—You could tell by having a section made of it.

Dr. Werner.—It is so altered and distorted by disease as to make it impossible for the Professor of Anatomy at Harvard Medical School (to whom I took it) to say what it is. I do not believe it is a root or two roots, and have never for a moment thought it was. The location from which it came was posterior in too great a degree to suggest that it might be tooth substance.

Dr. Stoddard.—I saw a case last summer of an imprisoned tooth which was causing a good deal of discomfort. It was a case of Dr. Allan's. The patient was a lady of middle age, who had been wearing an upper plate, all of the upper teeth having been extracted. An irritation was set up and there had been some slight discharge of pus from a small orifice, about half an inch long, back of the border of the alveolus and near the median line. By probing we could feel a little point which we thought was the enamel of a tooth, and after making a longitudinal incision the tooth was taken out and found to be a cuspid, which was lying along the median line with the crown pointing towards the alveolus, about half an inch from the front.

Dr. Briggs.—Regarding that matter of the treatment, I think we all understand the object of packing with cotton. It is so easy for the mucous membrane to heal over that it is very important that the orifice should be kept open as long as there is a cavity there. If the opening is allowed to heal too quickly it may enclose in the cavity a few drops of pus, and then the pus will continue to burrow, thereby increasing the diseased portion. That is one of the cases where I have found the antiseptic sponge of great value. It acts to keep the parts open without causing any irritation, and it also serves as a very good drainage-tube. I have usually inserted a long piece at first and shorten it daily as the wound progresses, and I have found it to be an excellent thing to keep the fistula open and allow it to heal from the bottom.

Dr. Werner.—In this particular case a drainage-tube was out of the question. It could not have been retained,—it would have fallen into the throat. The shape of the cavity was such that it required a peculiarly constructed tube. I think the antiseptic sponge would have done well, but I did not have it on hand at the time, and cotton served the purpose. It was dipped in oil of cloves and listerine, was tied in the centre with floss silk, the end being allowed to hang down, and was more comfortable than a tube could have been. The patient was most conscientious and faithful in the

treatment, keeping the wound clean as a surgeon could have done, packing it carefully several times a day according to the instructions given her. This packing was by degrees diminished until the orifice was allowed to heal up. The tissues healed phenomenally fast for an old person,—she had a good constitution, had never been sick, and was in the best of health.

I think this is one of those cases where the dentist did a conservative operation without the sacrifice of great quantities of bone tissue. It is my belief that if a general surgeon had operated, he would have obtained a good result, but by more heroic treatment, I think, the jaw would have been removed.

Dr. Clifford.—I would like to inquire of Dr. Werner what kind of probe he used. I find difficulty when treating such cases in getting a suitable one at the dental depots.

Dr. Werner.—I find two or three probes very essential, but in this case I first discovered the orifice with a fine burnisher, which had a handle tapering with a curve not a right angle. It made the best probe I could have procured for the purpose.

Dr. Hitchcock.—Most of the probes at the surgical instrument-stores are too large. I have found that a fine silver wire answers the purpose admirably.

H. L. UPHAM, D.M.D.,
Editor Harvard Odontological Society.

Editorial.

ARSENIOUS ACID IN DENTISTRY.

THE fact that the world of thought moves in circles is nowhere more apparent than in dentistry. This is, perhaps, inevitable, from the fact that each generation brings with it men cultured, it may be, in the scientific thought of the time, but not familiar with the past history of their profession, as they should be, nor conversant, as they certainly ought to be, with the treatment of pathological conditions in past epochs.

The extraordinary rush of apparent intelligence into what may be called the startling in therapeutics is without reason except that individuals may regard this as an open door to fame or notoriety; the difference between these two states may not be clear to some minds, and to them the terms are possibly interchangeable.

When Spooner, in 1836, introduced arsenic for the devitalization of pulps, he probably had no idea that fifty-four years thereafter it would be recommended for filling root-canals; but such has recently been done, and the matter gravely discussed by a learned society.¹

Arsenious acid, from its peculiar action, is fitted for the purpose of devitalizing pulps as no other known agent. It is not necessary to call the attention of our readers to any extent to its peculiar properties. These are well understood, and were it not for the fact that some seem to forget that in using it they are not only dealing with an escharotic, but one of the most powerful and insidious of poisons, it would not be necessary to allude to it here.

While there is still much to learn in regard to the action of this agent in its local, general, and cerebral effects, it is well understood that it does not destroy the tissue as some other escharotics, but the destruction of life is through a more complicated process, and has no immediate effect upon the continuity of the pulp. The action of arsenious acid is to first render the sensory nerves torpid, for Sklarek, quoted by Ringer, says, "Arsenic, therefore, paralyzes first sensation and reflex action and some time afterwards voluntary power." Ringer further writes: "My own experiments, conducted with Dr. Murrell, confirm this statement; but they show also that arsenious acid is a paralyzer of the motor and sensory nerves and of the muscles."

¹ Mississippi Valley Association of Dental Surgeons, March, 1891.

Probably no class of professional men have had this drug more closely under observation than dentists. For over fifty years it has been their one agent for the destruction of pulps, and when properly used is always reliable. Hence those who have observed closely have long since arrived at the conclusions quoted, and that the paralysis observed was a gradual process requiring a definite time for its completion, and its extent was only limited by the amount of arsenic applied. The torpidity of the sensory nerves of the pulp means a retardation of the blood-supply, and eventually death.

The action of this agent shows also a clearly-defined progress, and an examination of a removed pulp will exhibit a distinct line of demarcation between the affected and the non-affected portion, and this is of deep interest in a macroscopic as well as in a microscopic sense. It will have been noticed, in practice, that the antiseptic property of arsenious acid is of no value. This, in the discussion alluded to, was dwelt upon as the main reason for its use. While the agent fails to break up the tissue, it leaves the pulp and, consequently, all its connections in a condition to rapidly decompose, which takes place in a varying period of from ten days to two weeks.

The evidences are ample to demonstrate that the use of arsenious acid should be confined to that purpose which led to its introduction, and that even here it will fail and be productive of serious results in the hands of the careless or ignorant.

In the annual address alluded to the following formula was offered for "root-filling:"

R Arsenious acid, gr. ii;
Precipitated chalk, ʒ i;
Glycerin, q.s.
Sig.—To be made into a paste.

He says, "The dose of the arsenic is from $\frac{1}{20}$ to $\frac{1}{40}$ of a grain. The $\frac{1}{40}$ of a grain is probably all that is applied in this use of the drug, and this is *not in contact with soft tissue*. Even should it be forced through the foramen *its effect would only be beneficial*." (Italics ours.) It is not necessary to enter into any lengthy discussion of this quotation, as it probably carries with it its own antidote.

His mode of filling the canals is as follows: He takes "one-half grain of the mixture, equal in size to half a grain of wheat, mix with a single drop of water on a slab. Introduce into the canal, which should first be repeatedly washed with alcohol and thoroughly dried. Fill the canal perfectly with the compound. Then dry again, and in the majority of cases fill the tooth at once."

The supposition that there are no avenues for the agent to reach the pericementum is a fallacious one. Not only is the foramen present as an outlet, but it has been demonstrated that not infrequently other openings are found to expose a greater surface to the irritant. It has further never been proven that a continuous chain of canals do not exist, connecting the tubuli with the pericementum. On the contrary, there is much evidence to show that solutions can be transmitted from the pulp-canal to the periphery of the tooth.

Those who have had much experience appreciate the difficulty in preventing that much-to-be-dreaded pericementitis from arsenious acid. And so far from its being true that, "even if it did pass it could do no harm," it is certain to arouse periosteal inflammation of a serious character. If it fails to affect this, it is simply because the amount has been too minute to produce results beyond a limited area of tissue.

If this agent destroys the life of the pulp, in the manner previously outlined, it will have a similar effect on all tissues. This is well understood, and the sloughing of cervical margins is an apt illustration, and demonstrates what takes place when the pericementum is saturated with the solution. The result is death of this important organ, necrosis of the cemental tissue, and necessarily destruction of the corresponding alveolar plate. That any other view should be accepted is strange; and it is, further, a matter of surprise that any organization should seriously consider the subject, or conceive, as one present expressed it, "There may be more in this method than we are now able to conceive after all."

In the May number of the JOURNAL is a paper read before one of our own most prominent societies, in which arsenious acid and cocaine are recommended for sensitive dentine, although the writer acknowledges that "in private practice it is not desirable to try it as an obtunder, except in certain teeth like bicuspid, or others that are to be removed for regulating, for it might endanger the vitality of the pulp." While this is a saving clause, it would seem that the whole process should then and there have been denounced.

This mode of treating the hyperæsthetic conditions of dentine with arsenious acid has been repudiated by the dental profession for many years. A certain very prominent operator in this city (Philadelphia) applied it for this purpose more than a quarter of a century ago, and took one step in advance of the writer of the paper, for he regarded it possible to use it as an aid in the extraction of teeth.

It is only recently that several of the dental journals, including the INTERNATIONAL, felt called upon to expose a preparation that had

deceived some of the most intelligent dentists, and we are certain to have a flood of nostrums of a similar character if those who are the leaders of thought are not constantly guarding the best interests of their profession.

Dentistry has suffered enough reproach from the careless use of this drug, and no one having its welfare at heart dare pass by any reckless application of it. It has only one legitimate place in our work, and that is the one proposed by Spooner.

JAMES W. WHITE, A.M., M.D., D.D.S.

As we were about going to press with the last number we, in common with others, were shocked by the sudden death of Dr. White. His long career of activity as editor of the *Dental Cosmos* and his connection with the S. S. White Dental Manufacturing Company as its president has made his name and work familiar to thousands who never knew him personally. The death of his brother, Dr. S. S. White, threw a heavy responsibility upon him in the reorganization of that house, and its subsequent great success must, in a large degree, be attributed to his energy and skill as an organizer. He was a man capable of assuming heavy responsibilities, and the burden seemed to affect him less than most similarly situated.

While in no sense a practical dentist, so intimate were the relations between the profession and himself that few realized the fact, and he was ever a welcome visitor at the various conventions he was in the habit of attending.

In his difficult position as editor of the *Cosmos* he necessarily created antagonisms; but those who knew him best always found him genial and ever ready to do a kindly act. He lived in his work, and that was to broaden life and to make those with whom he was brought in contact better for his influence.

His charity was not of the obtrusive kind, but was a constant factor in his life. It was a pleasure to him to give of his medical knowledge gratuitously, and who can number the blessings he showered in many silent ways on those who needed help?

He was no idealist, and had but little sympathy for the sentimental side of life. As an editor he was a severe and uncompromising critic, which led many to erroneous opinions as to his real character.

The grave has closed over an earnest man, true in his social relations, progressive in all that led to the best growth of his native city, and faithful to all that goes to make for the highest good of all peoples.

SARATOGA SPRINGS, NEW YORK.

THE general opinion that living at Saratoga is expensive deters many from going there, and especially is this true whenever the American Dental Association has selected this locality for its place of meeting. Knowing this idea to be erroneous, at our request Dr. A. C. Rich, of Saratoga, prepared the list on another page. This covers most of the prominent houses. Subsequent personal inquiry enables us to give the terms per day and week. By writing in advance no difficulty will be experienced in securing comfortable quarters at moderate cost.

We desire to express our thanks to Dr. Rich for his efforts to make this list satisfactory to those needing the information.

SOUTHERN DENTAL ASSOCIATION.

THIS energetic organization, which represents the profession in the South, will meet this year at Morehead City, N. C., commencing August 11, 1891. The announcement did not reach us in time to notice in our last number.

We desire also to modify the statement in the same number in our article on "Conventions," in which the inference was drawn that the Southern was arranged with "permanent members" and "delegates," as the American Dental Association. This we learn is a mistake, they having but two classes,—“Active and Honorary.”

EDITOR OF THE DENTAL COSMOS.

THE death of Dr. James W. White made it necessary to fill the place he for many years so ably occupied. The selection has fallen upon Dr. E. C. Kirk of this city (Philadelphia). Dr. Kirk is well known as a writer in dental periodical literature, and will, without doubt, maintain the high standard which the *Cosmos* has held in the past.

BIBLIOGRAPHY.

W. D. MILLER, A.B., Ph.D., M.D., D.D.S. By W. C. Barrett, M.D., Buffalo, N. Y.

This is a brief but an interesting account of the active life of an earnest and untiring investigator. It was originally printed in

the *Dominion Dental Journal*. The excellent likeness of Professor Miller, therein given, accompanies this. It seems as though a portion of the narrative might have been omitted, as it relates to personal matters with which the public have nothing to do.

SCHWEIZERISCHE VIERTELJAHRSSCHRIFT FÜR ZAHNHEILKUNDE.

This quarterly journal is published under the charge of the Swiss Odontological Society, and is printed in two languages—French and German. The former is under the management of Professor Dr. C. Redard, of Geneva, and the latter Dr. Theo. Frick, of Zürich. The first number is filled with interesting matter, and under the two able editors will no doubt exert a valuable influence in Switzerland.

J. B. LIPPINCOTT COMPANY announce the eighth edition of H. C. Wood's "Therapeutics" in press, to be "ready for the use of medical students in the autumn." The work has been thoroughly revised and articles brought up to date.

P. BLAKISTON Son & Co. announce for early publication "A Hand-Book of Local Therapeutics." Harrison Allen, M.D., George C. Harlan, M.D., Charles B. Penrose, M.D., Arthur Van Harlingen, M.D., will have charge of the different parts devoted to the Respiratory Passages, Ear, Eye, Skin, etc. Dr. George I. McKelway will describe the pharmaceutical properties of each remedy.

Obituary.

JAMES W. WHITE, A.M., M.D., D.D.S.

DR. WHITE was born in Bucks County, Pa., in 1826, and was a descendant of Henry White, who settled in Virginia in 1645.

He began his business career May 13, 1841, entering the laboratory of his uncle, Samuel W. Stockton. The latter was the first, as far as known, to enter into the manufacture of artificial teeth as a business. His teeth had a wide reputation, and the manufacture rapidly developed into one of great importance. In this establishment we believe the originals of the S. S. White Manufacturing Company, Jones, White, and McCurdy, were also trained.

The origin of the present great house was at Seventh and Race Streets, Philadelphia, in a comparatively humble building. Here in

the attic James W. White began the manufacture of teeth. This work was all done by himself and necessarily crude. He states that the fissures in molars and bicuspid were made with a rat-tail file.

This establishment was subsequently moved to Race Street above Eighth. The writer of this retains, as a boy, a very vivid recollection of this humble start of the S. S. White Manufacturing Company, as well as that of the business place of the uncle that preceded it.

Thus for fifty years, from fifteen to sixty-five, the subject of this sketch was connected with the business, and was an active participant in the growth of the dental profession from its mechanical side from that period until the present.

Dr. James W. White married, October 28, 1847, Mary Ann, daughter of James and Maria McClaranan. He leaves, besides his widow, three sons,—Dr. J. William White, Samuel S. White, and Louis P. White, neither of whom follow the work of the father, the former being a prominent surgeon, the second a printer, of the firm of Patterson & White, printers of the *Dental Cosmos*, and the third a wholesale jeweller.

Dr. White was a member of the firm of Hance Brothers & White, Manufacturing Chemists.

The degree of A.M. was conferred on him by the St. Lawrence University, of Canton, N. Y., the degree of M.D. was received at the Department of Medicine of the University of Pennsylvania, and that of D.D.S. (honorary) at the Pennsylvania College of Dental Surgery.

The activity of mind, always a feature of his character, very early brought him into association with the best intellectual thought of Philadelphia. He was made secretary of the People's Literary Institute at the age of thirty-four, and was active in bringing to the city some of the ablest platform speakers, among them Beecher, Chapin, Curtis, Sumner, etc. This was at a period of great agitation on the slavery question, and a time when it required courage of a high order to maintain an unpopular position; but Dr. White never hesitated, and in a controversy with the then mayor of Philadelphia (Henry), he exhibited the same vigor in the defence of free speech as he at a later period demonstrated in his historical conflict with Mayor Fitler.

He was active in many public charities. The Maternity Hospital is due to his energy, and he remained at its head to the end. The Freedman's Aid Association claimed his interest, and when the great Sanitary Fair was organized, during the war, he was made

chairman of the Committee on Orations and Lectures, and realized the handsome sum of ten thousand dollars for that memorable effort.

At the reorganization of the municipal government, he was made president of the Department of Charities of Philadelphia under Mayor Fitler. This appointment was received with expressions of universal satisfaction; but he remained only a portion of the term, owing to disagreements between himself and his superior in office, and he left this important position with the regret of his fellow-citizens. Denominationally, he was a member of the Universalist Church, in which he was moderator for many years, and also was superintendent of the Sunday-school.

Of later years, he was present at all the large gatherings of the dental profession, and, although not a member of any of these organizations, he exerted a great influence socially, and his genial presence will be greatly missed at their annual convocations.

As president of probably the largest organization for the manufacture and sale of dental articles, and as editor of the *Dental Cosmos*, he will be best known to the profession. This periodical has, under his management, increased not only its reputation, but has become, as its name implies, a world's journal in its special line of thought.

All of those who laid the foundation of the house of the S. S. White Manufacturing Company have now passed away, but it has gone beyond individual limitations, and will continue as a monument to the energy and far-seeing abilities of Dr. S. S. White and his brother James.

He died in full harness, for he remained later than usual at his place of business on Tuesday the 26th, and early Wednesday morning he passed into the unseen. The immediate cause of death was heart-failure.

The funeral was attended by a large number of persons prominent in various walks of life. He was buried May 29, at Woodlands Cemetery, Philadelphia.

CHICAGO DENTAL SOCIETY—RESOLUTIONS ON THE DEATH OF DRs. WILLIAM H. ATKINSON AND JAMES W. WHITE.

At the meeting of the Chicago Dental Society, Tuesday evening, May 5, 1891, the following resolutions on the death of Dr. William H. Atkinson, of New York, were adopted:

WHEREAS, The Chicago Dental Society having learned of the death of Dr. William H. Atkinson, of New York, one of the most eminent, learned, and best known members of the dental profession, therefore, be it

Resolved, That in the death of Dr. Atkinson the members of this Society feel a sense of personal bereavement in the loss of a much loved and conspicuously useful member of the profession, and while we bow in humble submission to the Divine will, we desire to express our sorrow in his final exit to the unknown land beyond this world of ours.

Be it further resolved, That the Secretary transmit to the bereaved family of Dr. Atkinson a copy of these resolutions, and that a copy be furnished the DENTAL JOURNAL for publication.

J. H. CROUSE,
A. W. HARLAN,
W. W. ALLPORT,
Committee.

THE following resolution, by Dr. Allport, in regard to the death of Dr. White, was passed by the Chicago Dental Society:

WHEREAS, It hath pleased the Creator and final disposer of all things to remove from this world Dr. James W. White, of Philadelphia; and

WHEREAS, It is fitting that this Society should make some record of its appreciation of his virtues and of his useful life, therefore,

Resolved, That in the death of Dr. White dental journalism has lost its ablest editor, the business world a member of sterling integrity, the unfortunate and needy a practical philanthropist, and the church an exemplar of the nobility of a liberal Christian religion.

Resolved, That in their affliction we extend to his bereaved family our sincere sympathy, and with reverent humility we commend them to Him who has promised to be "the friend of the widow and the fatherless" and "a real present help in the time of trouble."

Resolved, That a copy of these resolutions be transmitted to the family of the deceased, and sent to the *Dental Cosmos* and other dental journals for publication.

RESOLUTION OF THE CENTRAL DENTAL ASSOCIATION, NORTHERN NEW JERSEY, ON DR. ATKINSON.

WE, the members of The Central Dental Association of Northern New Jersey, having learned with sincere regret of the death of our friend and fellow-member, W. H. Atkinson, M.D., D.D.S., of New York, who, by reason of his great abilities, scholarship, zeal, industry, and self-sacrificing devotion to the interests of the dental profession, and the never-failing willingness to impart his knowledge to all who asked it, he was recognized by us as the most influential member of our profession, a man who devoted his life to its honor and advancement.

During the eleven years of the existence of this Society he has scarcely missed a meeting, and his relations with us have been such, that it is our pleasure and duty to record our high appreciation of him.

That by the death of Dr. Atkinson the dental profession has been deprived of one of its most able and useful members, one whose influence for good will last while dentistry exists.

We have lost one of our best friends, and, as we fondly called him "Father Atkinson," so, indeed, do we feel we have lost our "Father in Dentistry."

We, therefore, extend to his family and to our brother members of the dental profession our sincere sympathy in their great bereavement, and that a copy of these resolutions be sent to the family of the deceased, and that they also be published in the dental journals.

(Signed)

J. ALLEN OSMUN,
C. S. STOCKTON,
CHAS. A. MEEKER,
S. C. G. WATKINS,
C. W. F. HOLBROOK,
Committee.

ST. LOUIS DENTAL SOCIETY—RESOLUTIONS ON THE DEATH OF DR. ATKINSON.

WE, your committee, appointed to present resolutions of respect to the memory of the late Dr. William H. Atkinson, of New York City, beg leave to offer the following:

WHEREAS, The members of the St. Louis Dental Society have learned with deep regret of the sad death of one who has been so closely identified with every advance made by the dental profession during the past twenty-five years; whose honorable career as a professional man has won for him a world-wide reputation, and whose personal qualities secured for him the love of every reading dentist in the world.

Resolved, That the St. Louis Dental Society recognizes the obligation dentists of America owe to the late Dr. William H. Atkinson for the zeal and energy with which he has advocated the many changes which have been for the elevation of his chosen profession.

Resolved, That as a mark of appreciation of the worth of the late Dr. William H. Atkinson, as a man and dentist, these resolutions be spread upon the records of this Society, a copy be sent to the family, and to the dental journals for publication.

WM. CONRAD,
WM. H. EAMES,
J. B. NEWBY,
Committee.

DR. RALPH A. PARSONS.

DR. RALPH A. PARSONS, Professor of Materia Medica of the Boston Dental College, died April 3, 1891.

Dr. Parsons was born in Stratton, Vt. He graduated in medicine at the University of New York in 1888, and settled in

West Roxbury, Massachusetts, where he acquired an extensive practice.

At a special meeting of the Faculty of the Boston Dental College the following resolutions were passed :

WHEREAS, in the dispensations of Divine Providence, a most highly esteemed and able instructor in this college, Dr. Ralph A. Parsons, has been removed by death, therefore, be it

Resolved, That in the death of Dr. Parsons the Boston Dental College has sustained the loss of an earnest and enthusiastic worker, one whose able, scientific, and practical instructions were shown in the remarkable progress of the students under his charge.

It is, therefore, voted that a copy of these resolutions be spread upon the college records, in the leading medical and dental journals, and that a copy be also sent to his immediate relatives.

GEORGE T. EAMES, M.D., D.D.S.,
Committee for the Faculty.

Current News.

THE AMERICAN DENTAL SOCIETY OF EUROPE.

THE American Dental Society of Europe will hold its Seventeenth Annual Meeting at Heidelberg-on-the-Neckar, in the Schloss Hotel, August 3, 4, and 5, 1891. The officers for the year are :

Dr. William R. Patton, Cologne, President ; Dr. Isaac B. Davenport, Paris, Vice-President ; Dr. Lyman C. Bryan, Basel, Secretary ; Dr. Charles H. Adams, Frankfort-on-the-Main, Treasurer.

Executive Committee.—Drs. Patton, Adams, and Wetzel.

Membership Committee.—Drs. Davenport, Jenkins, and Miller.

Members of the profession are cordially invited, and are requested to notify the Secretary at an early date of their intention to attend the meeting, contribute papers, or demonstrate before the Society.

The charming site of Heidelberg will allow the society to intersperse its three days proceedings with excursions to interesting points, and visiting the University and the ruins of the Castle.

NEW JERSEY EXAMINATIONS.

THE New Jersey Dental Commission will hold its next meeting for examinations in Asbury Park, N. J., on Monday, July 13, at 10 A.M.

Persons intending to begin the practice of dentistry in New

Jersey must make application to the Secretary of the Board prior to June 30, 1891.

G. CARLETON BROWN,
Secretary.

ELIZABETH, N. J., May 4, 1891.

AMERICAN DENTAL ASSOCIATION.

A RESOLUTION was adopted at the last meeting of the American Dental Association, authorizing the Executive Committee to communicate with members of dental societies and with the dental profession of the country, to the end that the membership of the various local and State societies may be increased; that the usefulness of the American Dental Association may be advanced, and the relations between it and the local societies be made more intimate. One object is to awaken a lively interest in the meetings of the American Dental Association, and to secure further representation from the various local societies at the annual general meetings. Will you be kind enough to show your pride in your local society by interesting yourself personally in this matter, and secure the appointment of delegates to the next meeting of the American Dental Association, to be held at Saratoga Springs, N. Y., August 4, 1891? In addition to the appointment of delegates, we would suggest that your society appoint a committee who will forward to the chairman of each section such matters of interest as have transpired in your society during the year. The facts need only to be given to the chairman or secretary in such shape as to enable him to include them in the general report of each section. The names and addresses of the officers of the sections are herewith enclosed. If the societies of which you are a member have already met, will you send the paper you have read, or an abstract of it, or a brief outline of what you said in the course of discussion, or a short report of the entire meeting, to some one of the chairmen or secretaries?

We desire a full attendance at the next meeting, as matters of great importance will come before it. Arrangements will be made to secure reduced railroad rates, but in order to get any reduction for return trip it is *absolutely necessary to get a "certificate plan receipt" for full fare paid* at time of starting, of the agent of whom ticket is purchased. The best hotel rates will be secured, and all who visit Saratoga will, we hope, be well repaid for the time and money spent in visiting that famous resort.

J. N. CROUSE,
Chairman Executive Committee.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE Eighth Annual Meeting of the National Association of Dental Faculties will be held at Saratoga Springs, New York, on Saturday, August 1, 1891, at 10 o'clock A.M.

Applications for membership must be in the hands of the Executive Committee, Dr. J. Taft, chairman, sixty days prior to the meeting.

Each delegate must be a member of the teaching Faculty in the college he represents, and bring a certificate signed by the president (or dean) and secretary of his college, stating that he is authorized to act for them.

Delegates must be in attendance promptly at 10 A.M. on the day of meeting, in order that all the business may be concluded before the meeting of the American Dental Association.

J. E. PATTERSON,

Secretary.

KEITH & PERRY BUILDING, KANSAS CITY, MO.

SOUTHERN DENTAL ASSOCIATION.

THE Twenty-third Annual Meeting of the Southern Dental Association will be held at Morehead City, N. C., commencing August 11, 1891. The officers of the association are as follows:

President, Dr. G. F. S. Wright, Georgetown, S. C.; First Vice-President, Dr. R. K. Luckie, Holly Springs, Miss.; Second Vice-President, Dr. W. H. Richards, Knoxville, Tenn.; Third Vice-President, Dr. Louis P. Dotterer, Charleston, S. C.; Recording Secretary, R. C. Marshall, Little Rock, Ark.; Corresponding Secretary, Dr. D. R. Stubblefield, Nashville, Tenn.; Treasurer, Dr. H. E. Beach, Clarksville, Tenn.; Chairman Executive Committee, Dr. H. J. McKellops, St. Louis, Mo.

M. C. MARSHALL,

Recording Secretary.

CONNECTICUT STATE DENTAL ASSOCIATION.

THE Twenty-seventh Annual Meeting of the Connecticut State Dental Association was held in Hartford, May 19, at which the following officers were elected: President, Dr. E. S. Gaylord, of New Haven; Vice-President, Dr. C. C. Barker, of Meriden; Secre-

tary, Dr. George L. Parmele, of Hartford; Treasurer, Dr. Joseph H. Smith, of New Haven.

Executive Committee.—Dr. James McManus, of Hartford; Dr. William J. Rider, of Danbury; Dr. Daniel A. Jones, of New Haven.

Resolutions of respect to the memory of Dr. William H. Atkinson were read and adopted and a copy ordered to be sent to the family.

GEORGE L. PARMELE,
Secretary.

ALUMNI ASSOCIATION OF THE PHILADELPHIA DENTAL COLLEGE.

At a meeting held April 9, 1891, all the graduates of the Philadelphia Dental College during the years 1886, 1887, 1888, 1889, 1890, and 1891 were elected members. Those desiring to accept such membership will please send to J. R. C. Ward, D.D.S., Treasurer, 1905 Fairmount Avenue, Philadelphia, their name, address, and one dollar entrance fee.

ALONZO BOICE, *President.*
L. ASHLEY FAUGHT, *Secretary.*

ALUMNI ASSOCIATION OF THE NEW YORK COLLEGE OF DENTISTRY.

OFFICERS: President, J. Howard Reed, D.D.S., M.D.S., 1881, 32 West Nineteenth Street, New York City; First Vice-President, John I. Hart, D.D.S., 1886; Second Vice-President, J. W. Taylor, D.D., 1884; Secretary, Vincent M. Munier, D.D.S., 1888, 102 West Ninety-fifth Street, New York City; Treasurer, Zachary T. Sailer, D.D.S., 1880, 40 West Thirty-third Street, New York City.

Executive Committee.—Chairman, Sherman B. Price, D.D.S., 1880, 13 West Thirty-second Street, New York City; H. J. Parker, D.D.S., 1883; E. S. Robinson, D.D.S., 1889.

College Committee.—Chairman, F. A. Chicherio, D.D.S., 1888, 2852 Atlantic Avenue, Brooklyn, N. Y.; George A. Hull, D.D.S., 1888; Edmund D. Frost, D.D.S., 1886; Arthur L. Swift, D.D.S., 1885; J. J. Strohmeyer, D.D.S., 1884.

ILLINOIS STATE DENTAL SOCIETY.

At the Twenty-seventh Annual Meeting of the Illinois State Dental Society, held at Bloomington, May 12 to 15, 1891, the fol-

lowing officers were elected for the ensuing year: President, W. H. Taggart, Freeport; Vice-President, Garret Newkirk, Chicago; Secretary, Louis Ottofy, Chicago; Treasurer, W. A. Stevens, Chicago; Librarian, F. H. McIntosh, Bloomington. The next meeting will be held in Springfield, beginning on the second Tuesday in May, 1892.

LOUIS OTTOFY,
Secretary.

LIST OF HOUSES AT SARATOGA SPRINGS, N. Y.

THE following places at Saratoga are recommended. The terms of all are reasonable and in many respects they are more comfortable than the hotels.

Name.	Proprietor.	Day.	Week.	Address.	Distance from Hall.
Temple Grove . .	A. B. Dowd.	\$3.00.	\$12.00—\$20.00.	Saratoga Springs.	5 blocks.
Huestis House . .	W. B. Huestis.	\$3.00.	\$17.50.	South Broadway, Saratoga Sp'gs.	5 "
Kenmore	J. N. Ramsdill.	\$2.00.		Saratoga Springs, N. Y.	2 "
Albemarle* . . .	W. J. Riggs.				5 "
Balch House . . .	W. S. Balch.		\$12.50—\$17.50.	526 North Broad- way, Saratoga Springs.	1½ "
Broadway House	S. Hine.	\$2.00.	\$10.00—\$14.00.	522 Broadway, Saratoga Springs.	1 "
Howland House .	J. Howland.	\$2.00—\$2.50.	\$10.00—\$15.00.	573 North Broad- way, Saratoga Springs.	3 "
Foley House . . .	Miss M. C. Fo- ley.	\$2.50.	\$14.00.	226 South Broad- way, Saratoga Springs.	5 "
Garden View . .	Mrs. T. S. Car- penter.				1 "
Lafayette House .	Mrs. M. A. Root.	\$2.00—\$2.50.	\$10.00—\$15.00.	Corner of Lafay- ette and Circu- lar.	4 "
The Linwood . .	S. M. Van Deu- sen.	\$2.00—\$2.50.	\$14.00—\$17.50.	South Broadway, Saratoga.	5 "
Trim Cottage . .	Mrs. H. P. Trim.				4 "
Tefft House . . .	T. T. Tefft.				4 "
Summer Rest . .	Mr. M. E. Morse.	\$2.00—\$2.50.	\$10.00—\$15.00.	Saratoga Springs, N. Y.	5 "
Vermont House .	Mrs. C. M. Dyer.				1½ "
Washington Hall	Mr. A. J. Starr.	\$2.50.	\$12.00—\$15.00.	587 North Broad- way, Saratoga.	3 "

* Those left blank have not responded as to terms. The rate per week is for one person.—[Ed.]

AMERICAN DENTAL ASSOCIATION.

THE Thirty-first Annual Session of the American Dental Association, will be held at Saratoga Springs, N. Y., commencing Tuesday, August 4, at 10 o'clock A.M.

GEORGE H. CUSHING,
Secretary.

COLLEGE COMMENCEMENT, UNIVERSITY OF PENNSYLVANIA, DEPARTMENT OF DENTISTRY.

THE commencement of the Departments of Medicine and Dentistry took place at the Academy of Music, Philadelphia, May 1, 1891. The degrees were conferred by the provost, Professor William Pepper. The address to the graduates was given by Professor James Tyson. Number of matriculates, 206 ; absent, 2 ; deceased, 1 ; graduates, 80.

UNION MEETING OF THE NEW JERSEY AND PENNSYLVANIA STATE DENTAL SOCIETIES.

THE joint union meeting of the New Jersey and Pennsylvania State Dental Societies will convene at the West End and Ocean Hotels, Asbury Park, N. J., Wednesday evening, July 15, at eight o'clock, and continue in session Thursday and Friday. No society business will be transacted at this meeting, and the most eminent men in the profession will read interesting papers. The clinics will be the most varied and newest in operative and mechanical dentistry. Two large halls, connected, have been provided for meetings, clinics, and exhibits. The Twenty-third Annual Meeting of the Pennsylvania State Society for the transaction of general business will convene at Justi's Dental Hall, Philadelphia, 10 A.M., Tuesday, July 14. The Twenty-first Annual Meeting and anniversary of the New Jersey State Dental Society will meet at the above-named hotels, Asbury Park, Wednesday, July 15, 10 A.M., for general business, the afternoon devoted to anniversary exercises. Full programmes will be mailed on application to Dr. Frank L. Bassett, Girard building, Philadelphia, or the secretaries.

C. V. KRATZER, D.D.S.,

Secretary for Pennsylvania, Reading.

CHARLES A. MEEKER, D.D.S.,

Secretary for New Jersey, Newark.

RAILROAD FARES TO THE AMERICAN DENTAL ASSOCIATION.

DR. CROUSE writes at the last moment, before going to press, that he has not yet completed railroad arrangements, but says, "Am quite sure that I shall be able to secure the *one and a third fare on most lines.*"

It is of importance for those paying full fare *to take receipt.* This will entitle the party to whatever reduction Dr. Crouse may be able to secure.

THE International Dental Journal.

VOL. XII.

AUGUST, 1891.

No. 8.

Original Communications.¹

THE INJURIOUS EFFECTS OF VEGETABLE AND MINERAL ACIDS UPON THE ENAMEL OF THE HUMAN TEETH, WITH SOME CURIOUS ILLUSTRATIONS.²

BY GEORGE W. WELD, M.D., D.D.S.

SOME one has said that an hypothesis is the life-blood of investigation, and that a person deserves as much credit for destroying an unsound one as he does by establishing a true one. Having had a certain array of questions before me in experimenting upon the effects of acids upon the enamel of the teeth, I shall attempt to put them in such order as may suggest further inquiry in this special direction, as well as to invite your attention to the results of my labor. Every one who has had experience in the chemical laboratory knows that the laws of chemistry are positive.

By the way of simple illustrations, when I pour a small quantity of sulphuric acid (H_2SO_4) on a piece of marble (carbonate of lime) we first see an effervescence,—the marble is dissolved, forming the *calcium sulphate* and carbonic-acid gas.

When I pour a small quantity of a six-per-cent. solution of acetic acid into a test-tube, and then add a little of the pulverized

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the New York Odontological Society, May 19, 1891.

carbonate of lime¹ (common chalk), we will see nearly the same chemical action,—viz., the substance is readily dissolved, forming, in this case, *calcium acetate*, the carbonic-acid gas being freely given off.

But acids act upon different substances with different degrees of energy. Thus it will be observed that when I add a like quantity of the phosphate of lime to the same solution of acetic acid there is no immediate chemical action; the phosphate of lime is held in suspension for a longer period of time. When I use acetic acid of the officinal strength, however, I find that both the carbonate and phosphate of lime are acted upon. If a weak mineral acid be used (a six-per-cent. solution of hydrochloric acid), we will see that both the phosphate and carbonate are immediately dissolved. Here, then, at the very threshold of our investigation, we find a weak vegetable acid which affects easily one of the constituents of the enamel of the teeth,—viz., the carbonate of lime,—while the same quantity of acid of corresponding strength has but little effect on the greater and principal constituent,—viz., the phosphate of lime; and yet both are readily dissolved by acetic acid of officinal strength and by a weak mineral acid. It would seem almost conclusive, from these simple illustrations, when considering the corrosive action of acids upon the enamel of the teeth, that while both the inorganic constituents of the enamel may be injured by weak acids, the first to be affected is that portion that is made up of the carbonate of lime. The effect produced by the same strength of acid on sections of matured enamel, when studied under the microscope, corresponds in many respects with the above experiments. I wish to say, however, at this point, that I shall make no attempt to enter into a study of the finer processes of the development and structure of the enamel. I am willing to leave that to the dental histologist and the skilful microscopist. I am aware that I am dealing with the coarser morphology of the enamel organ, and what I shall say on the subject may or may not affect or determine the presence and supposed existence of a *reticulum* or the former existence of the *enamel cell*. I am tearing down, so to speak, a delicate structure, which is perhaps the most difficult of all structures that the histologist is called upon to investigate. But if, in the process of tearing down and separating the enamel rods by my own method, I shall be fortunate enough to add anything that shall in any way assist

¹ The so-called chalk commonly used for black-board purposes is the *sulphate of lime*.

in settling a much mooted question, I shall feel that I have been amply repaid for my trouble. If a section of enamel be placed under a microscope and a small quantity of a twelve-per-cent. solution of acetic acid, by the use of blotting paper, be floated between the glass cover and slide, it will be observed, after a certain length of time, that everything has disappeared excepting a slight *residue*,¹ just as we said, a few minutes ago, the phosphate of lime disappears when using officinal acetic acid. If, however, in the same manner, we use a six-per-cent. instead of a twelve-per-cent. solution, we will find in the course of a few minutes that only one part of the enamel has been effected by the acid,—viz., the cement or interprismatic substance. And we find that we are enabled to separate and isolate the enamel rods without affecting their physical character; but the greater the strength of the acid the wider the spaces between the enamel rods will grow, until at last, if the acid be of sufficient strength, the whole structure succumbs to its influence and is dissolved. If, then, in the test-tube we find that a four-per-cent. solution of acetic acid acts readily on the carbonate but not on the phosphate of lime, while a stronger solution destroys both, and a corresponding and similar action upon the same inorganic matter when under the microscope, it would seem almost conclusive, from a chemical point of view, that the interprismatic substance is composed of the carbonate, and the enamel rods themselves of nothing more nor less than the phosphate of lime. Professor Elliott, who is with us this evening, will, I hope, later on give us the benefit of his experiments on this point.

In marked contrast is the action of weak acids upon the dentine of the teeth. In fact, it may be said that under certain circumstances a weak acid will decalcify the enamel without affecting to any appreciable extent the dentine. Here are a few specimens of the crowns of molar teeth, which were cut transversely across at their cervical portion. It will be observed that the enamel and the dentine have been completely separated, and, although the dentine is hard and apparently unaffected by the acid used, the enamel is soft and can be easily peeled off from the dentine. Drs. Heitzmann and Sudduth are of the opinion, however, that the dentine of these specimens is partially decalcified, although, it must be stated, when they were taken out of the acid solution the dentine was apparently as hard as it is at the present time.

¹ This residue is probably silica or the fluoride of calcium unaffected by the acid.

The present appearance of these specimens, the physical condition of the dentine and enamel, and their present relations as dry specimens would seem to indicate that previous to their immersion in the acid there was but little, if any, organic matter existing between the enamel and dentine. At least a magnifying glass of high power fails to reveal at the present time any organic fibres, and the acid¹ employed was very weak, and, I should judge, not of sufficient strength to destroy organic matter had it previously existed.

When I pour a small quantity of strong lactic acid into a test-tube, and add the carbonate of lime, which was dissolved, as we saw, by six-per-cent. acetic acid, we shall observe that the chemical action is extremely slow; but when I add the carbonate of lime to a six-per-cent. solution of the same acid, a solution about eight times less in strength, the carbonate is immediately attacked by the acid and dissolved. The strong lactic acid is thick and viscid, and the particles of the lime carbonate, when immersed in the acid, are doubtless coated over, which prevents chemical action. The same mechanical reason holds good when a tooth is immersed in a solution of acid and simple syrup,—the presence of the sugar in the solution coats the surface of the enamel, which, in the same manner, prevents chemical affinity. It is not always the strongest acid that dissolves the constituents of the enamel; but it is a matter of fluidity and solubility. All the vegetable acids affect the carbonate of lime, and with different degrees of energy the phosphate. Thus, if the phosphate of lime be added to a twelve-per-cent. solution of lactic acid it is very readily dissolved; and the ratio of effects obtained with a twelve-per-cent. solution of three different acids—viz., lactic, malic, and acetic—would seem to show that the lactic acid acts the most powerfully, the malic acid the next, and then the acetic. A six-per-cent. solution of malic acid, however, seems to act somewhat more readily on the carbonate of lime than either the lactic or acetic.

It seems rational to suppose that the enamel of the teeth is affected by acids at the weakest point in the enamel structure, and whether the acid be a mucous acid, or a result of fermentation in the mouth, or introduced from without, the law of affinity is

¹ The acid employed was one-half of one per cent. of phosphoric acid, the tooth being allowed to remain in the acid solution for a period of from one to four weeks. But almost any weak mineral acid will probably produce the same results.

always the same.¹ The cervico-labial surfaces of the enamel near the margin of the gums are the thinnest and weakest portion of the enamel, and consequently less capable of resisting the influence of an acid; especially is this the case when the gum has receded, leaving the edge of the enamel wholly or partly exposed. When an acid of any kind is taken into the mouth (supposing the mouth to be thoroughly rinsed with the acid), it will be found that the gums at their marginal portions retain the acid for a longer period of time than either the smooth surfaces of the teeth or the mucous membranes of the mouth. It is the retention of acids by the marginal portions of the gums, in connection with the constant presence of the so-called mucous acid at the same points, which I believe supplements and explains the etiology of erosion. The proof that the margins of the gums retain acids longer than the surfaces of the teeth or the mucous membrane of the mouth is very simple. Let any one first rinse the mouth, and brush the teeth with a strong alkaline solution, being careful to remove any acid mucus that may be present around the margins of the gums; then rinse the mouth thoroughly, first with a weak acid solution, and then water. In the course of a few minutes, or before time enough has elapsed for the formation of any acid mucus at the above-named points, it will be found that neither the surfaces of the enamel, nor any of the mucous membranes of the mouth, show any trace of acid; but apply the blue litmus paper at the margin of the gums and the presence of an acid is detected at once.²

By the way of further illustration in this connection, I wish to mention a case that has recently come under my observation and supervision. A patient, whom I had not seen for a period of five years, returned to have his teeth examined. I found, on examination, that his teeth were but little, if any, decayed, and the fillings, both gold and amalgam, appeared to be in good condition, but his front teeth, especially the canine and bicusps, near their cervico-

¹ It may be observed just at this point that when an acid comes in contact with lime-substance, whether in the mouth, in the street, or in the sewer, the destructive effect is the same, and no amount of after washing with an alkali will remedy the loss.

² There are only three secretions of the body which are regularly acid in reaction,—viz., the gastric juice, the urine, and the vaginal secretions. The above experiment would seem to indicate that the mucus, always present around the margins of the gums, corresponds in alkaline reaction (in a normal state) with the saliva; and is therefore only acid on account of the margin of the gums retaining the acids which are taken into the mouth from without.

labial portions, were very extensively grooved. In short, it was a typical case of erosion.

Now, this gentleman, about four years ago, was connected in business with the Pennsylvania Railroad Company, and was called upon at one time to supervise the shipping of a car-load of tooth-wash and powder to some western city; and the manufacturer made him a present of some of the wash and powder; and from time to time kept him well supplied. As the wash was very agreeable to the taste and cost nothing, he very naturally used it freely. When he had been informed of the nature of his trouble, he naturally inquired the cause. I told him that the etiology of the trouble was somewhat obscure, but that it was supposed to be due to an acid acting upon the substance of the teeth from without. He then informed me of the wash which he had been using. I asked him to bring me a small quantity of both powder and wash, and I would test them and see if they contained any acid. He did so with the following results: The *powder* was alkaline in reaction, and of course perfectly harmless; but the liquid proved to be acid in reaction, and I believe that the erosion of his teeth was due entirely to the generous use he had made of that wash. I have brought with me a sample of the wash, and will show by the use of litmus paper its acid reaction. It has, as I observed, a pleasant and agreeable taste, being flavored, I should judge, with anise and cloves. I believe that great injury is often done to the teeth by the ingestion of some one of the many proprietary medicines with which the market is so abundantly supplied. It seems rational to believe that the etiology of erosion is, first, the presence of an acid at the cervico-labial surface, that acid being introduced from without and retained at the margin of the gums, and that this acid first attacks the thin and weak surface of the enamel, and then the dentine. In this connection I have already demonstrated that lactic acid, the supposed acid of the mucus of the gums, acts upon the enamel more readily than the other weak acids, excepting, of course, hydrochloric acid.

To revert again to the question of fluidity and solubility, here is a tooth that has been immersed in the strong tincture of the chloride of iron, a mineral acid, for a period of twenty-four hours, and the enamel is not affected in the slightest degree; but another tooth that has been immersed in the tincture largely diluted with water for a period of *ten seconds* shows the surface of the enamel to be materially injured. If a piece of zinc be placed in strong sulphuric acid (H_2SO_4), it will be observed that the acid has no

effect upon the structure of the zinc, but if a little water be added to the acid the zinc is chemically destroyed. It is the sulphate of zinc, resulting from the first action, insoluble in the concentrated acid, that forms a protecting coat over the surface of the zinc; the addition of water dissolves this protecting sulphate and renders further chemical action possible. In the case of the tooth immersed in the strong tincture of iron a similar action takes place,—viz., the oxide of iron protects the enamel from immediate chemical action, owing to its compact adherence to its surface. To confirm this point, however, that the destructive effect of acids upon the lime salts of the enamel is dependent to a large extent on the fluidity and solubility of a solution, I will illustrate in a manner that may be considered a crucial test. You observed, a few minutes ago, that a weak solution of a vegetable acid dissolved the carbonate of lime very readily. I will now pour into a glass one teaspoonful of the concentrated sulphuric acid, a quantity sufficient to kill any ordinary mortal, and then will add about eight teaspoonfuls of alcohol, and to this solution will add a little of the carbonate of lime; you observe that the carbonate of lime is not disturbed to any very great extent, for there is but little if any chemical action. If, however, I employ one-half the quantity of this acid and the same proportion of water, instead of alcohol, the chemical energy proves very destructive.

The mineral acids are stronger and more destructive to enamel than any of the vegetable acids. Thus, if hydrochloric acid, instead of a vegetable acid, be used in the same proportion with water, we see at once an increased chemical and destructive energy. Hydrochloric acid is the acid contained in the tincture of the chloride of iron, a preparation of iron extensively employed by physicians throughout the civilized world. This form of iron seems to have special virtues which the other preparations of iron do not possess, and, notwithstanding its properties are extremely acid and astringent, it is employed not only in the treatment of anæmia, but also in large doses in the treatment of erysipelas, neuralgia, diphtheria, acute rheumatism, and other disorders which might be mentioned. It acts also as a diuretic; even in ordinary anæmia many authorities prefer it to any other preparation, claiming that its effects are shown more quickly and satisfactorily. These peculiar properties (especially the diuretic effect) are ascribed, by some, to a peculiar ethereal compound resulting from a mixture of the liquor ferri chloridi and the alcohol used in making the tincture, to which compound its odor is due. Almost every authority in materia medica

and therapeutics calls attention to the fact that this preparation of iron acts on the enamel of the teeth with destructive energy; also that it is not tolerated by the mucous membrane of weak stomachs. A great majority of physicians and dentists coincide with this view; and not infrequently, for the above reasons, physicians will prescribe other and inferior preparations of iron. If it were expedient or possible for the physician to prescribe alcohol, when administering acids, we would be relieved from further consideration of the subject; but alcohol, or spirits of any kind, for good and sufficient reasons, cannot, as a rule, be used. We are obliged, therefore, to look for some other liquid, as a vehicle, either to diminish the acidity or to entirely counteract this objectionable feature.

I have found that *Vichy water* answers this purpose admirably; favorable mention, however, is made of Apollinaris water. Two reasons exist why the muriate of iron may be administered with Vichy water without injuring the enamel,—first, a chemical reason; second, a mechanical reason. When one or two ounces of Vichy is added to a drachm of the tincture, a slight effervescence takes place, indicating that the alkaline constituents of the Vichy has neutralized the whole or a part of the free acid introduced with the iron. It is to be noted that this preparation of iron always contains an excess of acid,—*i.e.*, more acid than is essential to hold the iron in solution. The acidity of the iron being diminished, of course, there must necessarily be less affinity for the lime salts of the enamel. The use of Vichy water, therefore, in the administration of this preparation of iron simply eliminates an element of destruction,—*viz.*, the free hydrochloric acid,—without impairing in the least degree any of its specific or tonic virtues. But you may naturally inquire, Cannot this acidity be neutralized by other and different alkalies? Most certainly. But the trouble is in using just the right proportions. If too much alkali be used, the iron will be precipitated in the form of the hydrated oxide. I will illustrate by adding a little of the carbonate of lime to a solution of the iron diluted with water.¹ Vichy, on the contrary, seems to possess just enough quantity of the alkalies to dilute and neutralize the free acid without precipitating the iron (unless an excess be used). It is the excesses *in life* which oftentimes result in constitutional troubles. Our blood is always alkaline in reaction; an excess of alkalinity, however, does not tend to increase the red blood corpus-

¹ The point of dilution is determined only by mathematics, and reaches into hundred-thousandths of one per cent.

cles, nor improve the general health. The urine, in its normal state, is always acid, but an excess of acid results in a functional trouble. When this form of iron is administered with Vichy, we have simply a preparation of the perchloride of iron, minus the free hydrochloric acid, plus a small quantity of the chloride of sodium, lime, and magnesium.

The mechanical interference is due to the innumerable little bubbles which form and cover the surface of the enamel when Vichy is used as a vehicle. For instance, you will observe that when a tooth is placed in the tincture and water, not a bubble is to be seen upon the surface of the enamel; but if Vichy, instead of water, be used, you will observe that there are thousands of minute bubbles, which completely cover its surface. Now, these minute bubbles on the surface serve as a protection to the lime salts by interfering and preventing contact with the acid solution. This point is beautifully illustrated in the operation of Smee's battery. In this battery silver and zinc are the two metals employed; but the silver becomes coated with hydrogen bubbles to such an extent as to prevent contact with the acid liquid, which in turn interferes with the constancy of its action. Various schemes have been devised to overcome this mechanical interference. For instance, the surface of the silver has been roughened or corrugated in order to facilitate the disengagement of the bubbles of hydrogen. But this form of battery has been discarded, for the reason that in the more recent batteries this mechanical interference of the nascent hydrogen is overcome by the employment of other electrodes. I will leave the subject of polarization, however, to Professor Elliott, who will illustrate the subject on the black-board. The point that I wish to particularly emphasize is that the above-mentioned preparation of iron can be administered by physicians without the possibility of injuring the enamel of the teeth. And the means by which this end is attained, as above described, in no way interferes with the therapeutical effect of this iron compound. On the contrary, I believe the physicians who have prescribed the iron in this manner during the past four years will agree with me when I say that as a restorative agent, by the elimination of the free acid, it is more likely to be assimilated and tolerated by weak stomachs. The addition of a little syrup flavored with winter-green renders the compound more agreeable to the taste.

We will now briefly consider the *indirect action* of acids upon the enamel. By indirect action I mean the possible absorption of acids by the blood, decreasing its alkalinity, and thereby rendering

the fluids of the mouth more acid, and, in consequence, a condition of affairs which renders the enamel of the teeth more susceptible to corrosion. An alkali undoubtedly obeys a chemical law and neutralizes free acid, whether in the stomach or in the test-tube. But in this connection it must be borne in mind that the blood is always alkaline in reaction, and while there is reason to believe that its alkalinity may be diminished, there is no authority, so far as I know, that leads me to believe that its character in this respect is ever changed to such an extent as to render the fluids of the mouth abnormally acid. The presence of the alkalies is essential to the oxidation of the organic constituents of this fluid; in fact, as necessary to the life of the corpuscles as water is necessary to the life of a fish, or common air to the life of mankind.

To be sure, the urine in its normal acid state can be rendered alkaline in reaction by the ingestion of large quantities of the alkalies; but when the alkalies are withheld, it returns again to its normal and acid condition. The reason that the urine may be changed from a normal acid to an abnormal alkaline condition is probably due to the fact that the alkalies are chiefly eliminated by the kidneys. But I am unable to find any authority, and I know of no good reason for believing, that the secretions of the salivary glands in their normal alkaline state can be rendered acid by the ingestion and absorption of acids by the blood. And while I am not prepared to say that such a thing is impossible, I believe it to be very improbable. Clinical observation in the future may show that such a thing occurs at certain times under certain physical conditions, but it will then remain for some one to advance the true physiological reasons.

ADDRESS BY EUGENE S. TALBOT, M.D., D.D.S.¹

GENTLEMEN,—Dentistry from the earliest period up to the present time has been practised by medically educated men. Hippocrates, B.C. 460, speaks of dentifrices and the fixing of the teeth. Celsus, at the end of the first century, Ætius, in the sixth, Egenolff and Ambrose Paré, in the fourteenth, all mention certain forms of treatment of the teeth. John Hunter (1728) spent much

¹ Chairman of the Section of Dental and Oral Surgery in the American Medical Association, held at Washington, May, 1891.

of his time in the study and treatment of the teeth, as well as the study of general anatomy. Fouchard, 1747, Bourdet, 1786, Fox, 1814, Catalan, 1826, all practised dentistry, and also wrote extensively on dental subjects.

The instruments for dental as well as surgical purposes, which are to be seen in the museums of Europe, together with the beautiful specimens of Etruscan and Phœnician dentistry, now in the possession of Drs. Van Marter, of Rome, Barrett, of Buffalo, and Taft, of Cincinnati, and which are similar to those made to-day, are striking illustrations of the superior ability which men of early times acquired.

About 1826-30 the practice of dentistry was not wholly in the hands of an enviable class of individuals. Many were watch-makers, barbers, and tinkers of various descriptions, who had taken up the practice for the money that was in it, and were roaming about the country extracting teeth and inserting artificial ones, regardless of honor and ability.

There were, however, a few medical men practising dentistry who had obtained a high standing in their chosen profession, and who were anxious to hold their special calling upon an equal footing with other branches of the healing art. Among those, whose names stand out conspicuously in the history of this country are, Parmly, Brown, Hayden, Tucker, Hudson, Greenwood, Maynard, Trenon, Harwood, Chapin A. Harris, and Keep.

We can easily imagine the feeling of these men, who, by reason of superior skill and ability, had attained high positions in their chosen specialties, when they met in council together to discuss the different subjects relating to the standing of the calling with other specialties and the qualifications for admission to their society. It was not until 1839 that any movement was made on the part of these men to elevate their specialty from the slum in which a majority of the so-called practitioners were holding it. It was at this period that one of the most important events in the history of dentistry occurred.

The *American Journal of Dental Science* made its first appearance, with Dr. Chapin A. Harris and Eleazer Parmly as its editors. The American Society of Dental Surgery was organized in 1840. In connection with these movements, it was the ambition of Dr. Harris to organize a dental school in unison with the Medical Department of the University of Maryland. The practice of dentistry, with few exceptions, being at a very low ebb, did not impress the Faculty of the University as being of sufficient importance to be

considered a part of the healing art. The request of Dr. Harris was therefore rejected. Whether this request, at this period in the history of dentistry, would have been rejected by the Faculty of any other medical college in this country, or whether it would have been rejected if presented to the Medical Department by any other person, or at any other time, we have no means of knowing. Nor do we know much of the general feeling among physicians at that time, in regard to the relation of dentistry to medicine. We only know that the rejection of the proposition gave Dr. Harris new energy, and, as a result, the Baltimore College of Dental Surgery was established, and that the school of medicine and the school of dentistry ignored each other for a time.

Whether the establishment of a strictly dental school, together with the conferring of a separate degree from that of the medical school, has benefited dentistry it is difficult to say.

The original idea of Dr. Harris, if it could have been successfully carried out, would, no doubt, have placed dentistry as a calling upon a higher plane than it occupies at the present time. His idea was that, by this union, the Dental Department, being a legitimate specialty of medicine, would thus draw support from the medical profession at large. Be that as it may, dentistry, forced upon its career with a new degree, had, with very little aid from the medical profession, to work its own way as best it could. This incident marked one of the greatest epochs in the history of our calling.

Like the young man sent away from the parental roof, dentistry has grown strong in some of its features. The Baltimore College, owing to the talent of unexceptionably able men, flourished, and men of ability were graduated, who practised dentistry in different parts of the country, with the new degree of "Doctor of Dental Surgery." So successful was this college that other schools of dentistry were organized shortly afterwards, and these in their turn became as successful as the mother school.

From the first, graduates of dentistry, who were ambitious to excel, have never been satisfied with a dental degree only, and many men, anxious to acquire higher attainments, have taken the medical degree also. Many of the graduates are anxious to acquire a broader and more liberal education, but time and purse do not permit it.

Dental students have been ambitious to obtain the highest acquirements, and, in many cases, have not been satisfied with the course of instruction in our dental colleges. The dental Faculties have been obliged to so shape their course, and so far as possible

have made arrangements with medical colleges, that by taking one additional course, their students could receive the medical as well as the dental degree. And there has been a desire, on the part of both medical and dental graduates, to draw the medical and dental schools together, as evidenced by the fact that medical men are anxious to secure positions in the dental colleges; this desire may not have been outwardly intentional on the part of some, but the relations of one to the other are so close that scarcely any distinction really exists. I have frequently heard medical men, those who have had experience as teachers in both colleges, say that they prefer to lecture to dental students.

The first dental college to unite with a medical college was the St. Louis College. The St. Louis Dental College was founded in September, 1866, and the first announcement stated that the students will have the benefit of all lectures in anatomy, chemistry, physiology, and materia medica, that are given to the matriculants of the St. Louis Medical College, the first college to take the step in this direction.

Following this, in 1867, the Harvard Dental School was organized in connection with the Harvard University; since that date, most of the universities in this country have established dental departments. The older dental colleges are uniting themselves as rapidly as possible to universities, so that at the present time nearly one-half of the dental colleges are departments in the different universities. Ever since the formation of the Massachusetts Medical Society, in 1781, it has had members practising dentistry; and the Suffolk District Medical Society, which is a part of the Massachusetts State Medical Society, created a section in 1866, called No. 5, for "Surgery and Dentistry;" this is now a quarter of a century old. In Massachusetts, forty or fifty years ago, no reputable dentist would take a pupil unless he would engage to take a full medical course, or had already graduated in medicine. Scarcely a dentist, who has been in practice for twenty-five years, and who has sons growing up, who is not anxious to have them take a full course in medicine before taking up the subject of dentistry, which they regard as a specialty in medicine.

This brief history has been given to show that our best educated early practitioners in dental surgery have always regarded it as a specialty in medicine rather than an independent profession. Dr. Harris so regarded it, and he was the founder of our first dental college, and established this college for the reason that he was not permitted to organize a dental department in a medical college, as

he preferred to do. This is evidenced from his inaugural address at that time.

"Allow me," he said, "to observe, however much of interest or curiosity the establishment of this institution may have awakened, it constitutes an era in the history of a most useful and valuable *department of medicine*."

In speaking of the empiricism that had up to that time existed in the practice of dentistry, he says, "I feel bound to the public, and to my own reputation, to denounce the empiricisms that have existed and do still exist in the *department of medicine*." Again he says, "It is to be hoped that the day is not far remote when it will be required of those to whom this department of surgery is intrusted that they shall be educated men."

Although dentistry apparently succeeded from the mother profession in 1840, it was so near akin to it that, with few exceptions, there has been a yearning on the part of the dental graduates to return to the parental roof. Many graduates of dentistry have availed themselves of the opportunity, and the numbers are increasing every year.

With the convening of this meeting, the Section of Dental and Oral Surgery in the American Medical Association enters upon the tenth year of its existence. At the session of the American Medical Association, held in Richmond, Va., 1881, Drs. W. W. Allport, J. W. Brophy, E. S. Talbot, Chicago; Dr. J. L. Williams, Boston; Dr. G. L. Goodwillie, New York; Dr. Hauxhurst, Grand Rapids, Mich.; and Dr. G. L. Parmalee, Hartford, Conn., practitioners of dentistry, holding medical degrees, presented themselves as delegates from local medical societies for the purpose of organizing a section on dental and oral surgery. Each gentleman constituted himself a committee of one to champion the movement among the members of the Association who were in attendance. They found no opposition whatever; on the contrary, the oldest members, and especially the ex-presidents of the Association, were heartily in sympathy with the movement, and were anxious to assist in bringing it about. At the morning session, Thursday, May 5, Dr. Samuel D. Gross, of Philadelphia, asked for a suspension of the regular order of business, which motion was granted. He then moved that the by-laws of the Association be so amended as to create another section, to be known as No. 7, entitled Dentistry. The motion was favored by Dr. Sayre, of New York, and Dr. N. S. Davis, of Chicago, and was adopted. The object of suspending the rules at this time was for the purpose of creating the section, so that we might

organize and commence work at that session; the members who were to constitute the section being prepared with papers for that purpose. Dr. Toner, of Washington, objected, saying that he was not opposed to the section organizing and commencing work this year, but he did not wish to make a precedent for future sections. It was therefore decided that it could not go into operation until the next year, when, according to the constitution and by-laws of the Association, dentistry was officially recognized by the American Medical Association.

The effect that this movement produced upon the so-called dental profession was, in one respect, magical. Before this period scarcely a meeting of dentists convened without having upon its programme a paper upon the subject of "Is Dentistry a Specialty in Medicine?" Strange as it may seem, many took the ground that it was not, ignoring the fact that it had been practised as such by some within the last forty years; that many of its branches were taught by medically educated men, and also that we were practising on a part of the human body. Since this period scarcely a paper has been written upon this subject. The action taken by the American Medical Association, as well as cases which have been lately decided by the courts, have legally settled the question forever.

Fortunately there is little opportunity for wire-pulling or scheming for political preferment in our section, for well it is known that the majority of our members prefer that the offices be given to others than to themselves. Thus the time devoted to the section has been entirely given up to the reading and discussion of papers, and in no dental society in this country has there been presented such an array of scientific papers as has been given in this section. The men who have taken part in the meetings have in most cases been of exceptional ability, and whose standing in the specialty has added dignity to its meetings. The influence of the work in this section upon the medical profession has brought about a marked change in the Association.

The Section of Dental and Oral Surgery is recognized as a part of the whole, and its members exert as much power in promoting the welfare of the body as do the members of other sections. Indeed, the members have had the pleasure of listening to papers and discussions at its sessions by some of the ablest men of the Association, which not only added interest to its meetings, but also showed that the members are in full accord with the specialty as a part of the general body.

Since the organization of this body, editors of medical journals have become quite liberal as well as more intelligent in their discussions of dental subjects, and have taken more interest generally in the affairs of dentists; and physicians have accepted invitations to read papers before local dental societies, and dentists have read papers before medical societies. This shows the interest which an interchange of thought is developing by the union of the different branches of the healing art. Since the formation of this section, through the efforts of W. W. Allport, teaching in regard to dental diseases has been established in many of the medical colleges of Chicago, which example has been followed in other colleges in the country. One of the arguments used by some dentists against the theory that dentistry is a specialty in medicine was that the medically-educated person knew nothing of dentistry, or those diseases of the oral cavity which result from diseased teeth. Medical men could hardly be expected to know much in regard to the lesions of the mouth, they having received no special instruction upon this subject. The action taken by Dr. Harris and the medical faculty in 1840 no doubt impressed the faculties of other medical colleges with the idea that lesions of the mouth resulting from diseased teeth were of little consequence, and therefore knowledge of them of little value to the general practitioner.

Now, however, medical men as well as dentists know that many lesions of the body are the direct outcome of diseased teeth. In my capacity as a dental teacher in a medical college I have instructed the students for the past eight years that (in my opinion) many of the diseases of the body, such as pneumonia, consumption, typhus and typhoid fever, eruptive fever, suppuration of the throat and tonsils, aphthæ, ulcers, etc., were the outcome of a collection of micro-organisms in the mouth and decay of the teeth. My reasons for this theory were that in many instances in my practice I have observed patients entirely recover from supposed consumption and other bodily ailments after the mouth had been put in a healthy condition. In one case a lady gained thirty-five pounds in weight; a young man gained thirteen pounds, and a young girl, who had been treated for six months for consumption, and was supposed to be on her death-bed, entirely recovered after having a number of roots of teeth removed and tonics administered. This theory has been confirmed by Professor Miller, of Berlin, who has observed the bacillus tuberculosis and the bacilli of other diseases in the mouth. In his work upon "*Micro-Organisms of the Human Mouth*" he shows how many diseases of the body are produced by

pathogenic bacteria, by inspiration, absorption, and being taken into the alimentary canal, which have accumulated in the mouth. To-day many of the medical colleges of the country have a chair upon dental and oral surgery, and the students are now taught dental anatomy, physiology, and pathology. Of the six medical colleges in Chicago there is not one that does not provide for instruction in these branches by some dentist. No medical student should be allowed to graduate without some knowledge of the laws of diseases and their effects on the mouth and teeth, and no medical college to-day can be considered complete without a chair upon this subject.

In view of the fact that able practitioners of dentistry were debarred from becoming members of the American Medical Association, on the ground that they did not belong to some local medical society, at a meeting held in Chicago in June, 1887, Dr. Allport conceived the idea of having a resolution passed which should admit as members men of ability who held the D.D.S. degree.

With the assistance of Dr. N. S. Davis, the following resolution was presented and unanimously adopted :

Resolved,—That the regular graduates of such dental and oral schools and colleges as require of their students a standard of preliminary or general education, and a term of professional study equal to the best class of the medical colleges of this country, and embrace in their curriculum all the fundamental branches of medicine, differing by substituting practical and clinical instruction in dental and oral medicine and surgery, be recognized as members of the regular profession of medicine, and eligible to membership in this Association on the same conditions and subject to the same regulations as other members.

In the following year, 1888, the Chicago Dental Club, having adopted the code of ethics of the American Medical Association, sent the following members as qualified under the resolution : W. W. Allport, A. E. Baldwin, John Marshall, and E. S. Talbot, and since that year, 1888, the Dental Club has continued to send members to the Association. The adoption of this resolution by the representative society of the country would seem to show that the medical profession had done its full part to recognize *properly educated* dentists as legitimate specialists in the practice of medicine. The question of relationship has now been definitely settled forever, and the only question now remaining is this : What proportion of dentists in the future will so qualify themselves to practise dental and oral surgery that they will have the right to be classed as

medical specialists, the same as surgeons and ophthalmologists, and entitled to recognition in the Association in accordance with the letter and spirit of the resolution referred to?

Professor Garretson, in a letter to me, states that in the Philadelphia Dental College, which is in connection with the Medico-Chirurgical College, the following distinction is made between the course conferring the D.D.S. degree and the one conferring the M.D. degree, or both. On matriculation the student signifies his intention to take the M.D., or a dental degree, or both. If he chooses the course conferring the dental degree, he is taught only such branches as pertain to the treatment and filling of teeth. On the other hand, if he signifies his intention to take the M.D. degree, or both, he receives instruction in the branches that will fit him to practise oral surgery, or oristry, and medicine as well as dental surgery. The professional position that the educated dentist occupies at the present time could not be improved upon, as is true of the position he holds in society. His relations with the mother profession are as free and broad as the air of this great American continent. It now remains for him to decide whether he will be satisfied with little education,—with an education that permits him to see only faintly, and to realize not at all the possibilities of his profession, and renders him content to grope along in the lower stratum of his practice, seeing and wishing nothing higher, possessing only narrow views in regard to his calling, attending no societies, or only those whose time is given to discussions on such subjects as red rubber, amalgam, and root-filling, extraction of teeth, and insertion of artificial dentures. If he is content with these things, and looks upon the profession of dentistry as a trade, merely as a means of subsistence, with as little expenditure of power and thought from himself as possible, will he rest satisfied with this position, or will he take a broader view of the situation, looking at dentistry from all sides, thinking the subject worthy of all his power, all his talents and ability, striving to make it equal to the mother profession, and educating himself so that he may stand upon an equal footing, shoulder to shoulder, with the best medical men in the country?

Some one may say that he has not the time nor the money for this. In answer to this, permit me to refer to a professor in the University of Berlin to show that it is possible for a poor American boy to *educate* himself for the practice of dentistry.

His worth was recognized by the Faculty of the University of Berlin, and a position was offered him as professor in the University,

an honor that has been accorded to no other American. And during my late visit to Berlin it gave me great pleasure to observe the respect shown by the Faculty of the University, government officials, as well as the highest officer in the International Medical Congress, to Professor W. D. Miller. This example is only given to show that to him who works in the right direction all things are possible, and the higher he places the limit of his attainments the greater will his attainment be.

Let the dentist be a scientist and not a mediocre and narrow-minded tradesman. Let him select a new mark every day at which to aim his energies and talents, and let that mark be ever ahead and ever on a higher plane.

THE TEETH OF INVERTEBRATE ANIMALS.¹

BY ALTON H. THOMPSON, D.D.S., TOPEKA, KANSAS.

THE resources of nature are infinite. The expedients to which she resorts are marvellous and endless in their variety. When new conditions are to be met, her invention is never at a loss, and her capacity for change is boundless. Environments change and corresponding alterations in organs arise to meet the new conditions presented. The life of a species depends upon this power to change to conform to new environments. The law is adaptation or extinction.

In no set of organs—in animal life at least—is this infinite variety of resources, or the capacity for change, or the power of invention, so fully illustrated as in the teeth. Food selection has created a wonderful variety of forms of teeth which have arisen in response to changes in the food environment. Those species which could conform to gradual change survived and transmitted the acquired modifications in the dental apparatus. Those which could not change perished, or escaped to a more favorable food environment. From such causes many variations in the teeth of animals arose in the course of the geological ages, and, taking the living and the extinct species altogether, the number and extent of these

¹ Read before the Section of Dental and Oral Surgery in the American Medical Association, held at Washington, D.C., May, 1891.

variations is beyond estimation. The variety presented in the different forms of teeth and masticating apparatus throughout the animal kingdom illustrates and exemplifies the fact that these organs are susceptible of great variation, and that the possibilities of change and the invention of nature are especially marked in these organs.

If vertebrate animals present great variations and many extraordinary forms and interesting extremes in the structure of the dental armature, so also do the invertebrate animals, although these are not so well known. To the dental student the teeth of invertebrates are interesting from the comparative stand-point, and serve to illustrate the remarkable possibilities of dental variation, and help to a better understanding of the principles of the mechanical evolution of the teeth of animals. In such studies, any knowledge is valuable which may contribute, even remotely, to a better understanding of the important organs which we are called upon to preserve, and thus better prepare us for our chosen work. The study of comparative anatomy is of great value for the side-lights it throws upon the teeth of man,—their origin, evolution, mechanical design, etc.

Professor Huxley says ("Anatomy of Vertebrates"), "When invertebrate animals are provided with teeth or masticating organs, the latter are either hard productions of the alimentary mucous membrane, or are modified limbs, as opposed to vertebrate animals, which also usually possess hard productions of the alimentary mucous membrane in the form of teeth; but their jaws are ordinarily parts of the walls of the parietes of the head and have nothing to do with the limbs."

The vertebrate jaw is part of the endo-skeleton,—the invertebrate jaw belongs to the exo-skeleton, as do the teeth of all classes of animals, as illustrated by their embryology.

Mr. W. H. Dall says ("American System of Dentistry"), "Almost every large group of organisms below the vertebrates, until we reach the molluscoidæ and lower radiated animals, exhibits in some of its members one form or another of prehensile or masticatory apparatus connected with the alimentary canal. None of these exhibit true homologies with vertebrate teeth, though some of them present remarkable similarity to the latter in external relation. Throughout the invertebrates the teeth are dermal structures, however much modified, and may consist of calcified connective tissue of horny matter, or of chitin or an allied substance. The teeth and jaws of mollusks, the nippers, mandibles, and setæ

of worms, are composed to a greater or less extent of chitinous material."

Professor A. S. Packard says ("Standard Natural History"), "Hard bodies serving as teeth occur for the first time in the animal series, in the sea-urchins, where a definite series of calcareous dental processes, or teeth, with solid supports and a complicated muscular apparatus, serves for the comminution of food. Among the worms the organs of mastication for the first time appear in the Rotatoria, where the food, such as infusoria, etc., is crushed and is partly comminuted by the well-marked horny and chitinous pieces attached to the mastax. In most other low worms the mouth is unarmed. In the leech there are three, usually in the annelids, two denticulated, serrate, chitinous flattened bodies situated in the extensible pharynx of these worms, and suited for seizing and cutting or crushing their prey.

"In the higher Mollusks, such as the snails and others, besides one or more broad pharyngeal jaws, comparable with those in the worms, is the lingual ribbon, admirably adapted for sawing or slicing sea-weeds or cutting or boring into hard shells, acting somewhat like a lapidary's wheel; this organ, however, is limited in its action, and in the cuttles, the jaws, which are like a parrot's beak, do the work of tearing and biting the animals serving for food.

"In the Crustaceans and insects we have an approach to true jaws, but here they work laterally, not vertically, as in the vertebrates; the mandibles of the articulates are modified feet, and the teeth on their edges are simply irregularities or sharp processes adapting the mandibles for tearing and comminuting food. The numerous teeth lining the crop of crustaceans and insects serve to further comminute the food, keeping the larger particles back till finely crushed."

Professor Bradley says ("Manual of Comparative Anatomy"), "The lowest forms possess no teeth, except some ciliate infusoria, which have an internal cylinder of parallel rods for the mastication of food. In the Rotifera, the denticles are in the shape of denticulated plates. The Echinodermata have five large teeth placed in the formidable apparatus called 'Aristotle's lantern.' In the Annulosa, the leech is the only member that possesses teeth, the semilunar plates embedded in the muscular walls of the mouth; but the remaining classes have only mandibles and maxillæ, which are very hard and chitinous. Among the Mollusca, the gasteropods possess a strap-like organ, the odontophora, which is studded with

teeth. Cephalopods possess horny jaws which move vertically. Some other classes have denticles besides.

"In the Annelida so-called teeth occur in many groups, but partake rather of the nature of jaws than teeth. This group comprises most of the worms, as well as the leeches. Their bodies are divided into more or less well-defined, regular segments, and in general the jaws are on the second or buccal segment, or on a proboscis which is itself on the outer edge of this segment, and may be protruded from the mouth to a considerable distance. They are chitinous, most commonly paired, lateral opposite, of almost infinite variety of forms, resembling in a general way the maxillæ of insects, and mimicking, in miniature, hooks, combs, saws, rasps, claws, etc.

"In the leech the mouth is provided with three lenticular jaws, with the projecting edges finely serrated, having a partly rotary motion about a point central to the three. The medicinal leech has two rows of serrations on each jaw.

"Among the Crustaceans (lobsters, shrimps, crabs, etc.), the maxillary organs are but modifications of entire limbs translated from the locomotive series and set apart as special mouth-organs. In the higher crustaceans, the anterior part of the stomach is provided with certain masticatory appendages or stomacholiths, often termed teeth, though more analogous to a sort of a calcareous gizzard. These consist of several calcareous pieces, moved by appropriate muscles inserted in the membranous wall of the stomach, armed with a smooth medium plate and lateral molar-like organs, whose mimetic resemblance to the molar teeth of some forms of mammalia affords a beautiful illustration of the way, through the selective influence of similar functions, analogous structures may be built up in organs which have no homology whatever. Two smaller points, bicuspid in the lobster, tricuspid in the crab, complete the calcareous apparatus.

"Among the Echinoderms, the sea-urchin has a remarkable apparatus called 'Aristotle's lantern,' which contains what may be fairly regarded as true teeth. It is very complicated in its arrangement, but in essentials consists of five hard, calcareous, wedge-shaped sockets or alveoli, each containing one porcelainous chisel-shaped tooth. The teeth are, like those of rodents, usually worn more on the inner than on the outer side, and therefore in wearing always preserve a sharp edge. The combination of the teeth and alveoli produces a pentagonal cone, the apex being formed by the coming together of the points of the teeth. In life this cone

is concealed within the tissues, only the points of the teeth projecting."

Not many of the Mollusca are provided with teeth; the entire group of Acepala (the headless mollusks such as clams, oysters, mussels, etc.) are entirely without head or dental apparatus; and not every one of the Cephalopoda (whelks, snails, periwinkles, etc.) are provided with teeth, but most of them have such organs. When they are found, they are arranged on the "odontophore, a chitinous band upon which the teeth are set, pointing upward and backward like the papilla on a cat's tongue, and it grows out of the radular sac in the floor of the gullet. This is controlled by muscles which draw it backward and forward, or even protrude it, as can be seen in the common wood-snail," in which the buccal mass is pushed forward to seize and cut food. In the snail the number of these teeth is remarkable; twelve thousand to forty thousand have been counted on the saw-like lingual ribbon. It can cut grass or leaves sharply off. As the teeth are worn off the ribbon, it is uncoiled and new teeth are thus brought into use. The upper part of the mouth is lined with a horny substance, against which the sharp-toothed tongue works with a rasp-like motion. The tough leaves of the lily may often be found cut by the snail's lingual ribbon.

"The teeth on the strap-like odontophore are varied and remarkable in shape and size and are difficult to examine, as some of them are very minute and hard to dissect out and study. They are usually composed of a base, a shank or stem, and a cutting edge, the latter simple or variously denticulated. The form of the cutting edge is varied, the carnivorous forms usually having simpler and more claw-shaped teeth. When arranged in rows, as they are in many forms, the middle row is called the median or rachidian teeth, and the lateral rows the lateral or pleural teeth. The latter are usually right and left.

"Sometimes there are teeth outside of the lateral rows, which are called the Uncini, and are flat, plate-like, or slender, spiny teeth. They may be very numerous, as in the vegetable-feeding snails, or wholly absent in other forms."

There is much to be observed about the teeth of snails and their allies, and the field offers a profitable opening for investigation. They are already divided into classes by an elaborate system of arrangement, but much remains to be done in describing varieties.

"The adult perfect teeth vary from nearly transparent to an amber-yellow or reddish-brown, and sometimes the cutting points

are black. In any large whelk they are easily seen, and in a large cuttle-fish the radula may be an inch wide. On the other hand, in some small land-snails, where the whole shell is not larger than a pin-head, high powers are necessary to observe them. The highest type in the system of classification is called the *Toxoglossal*, or arrow-toothed, from their narrow, round form, often barbed, and sometimes hollow to inject poison, as in *Bela* or *Conus*.

"Next comes *Rachiglossa*, having only rachidian teeth, as in the common whelk. The teeth are usually slight and varied, and prettily denticulated on the cutting edge. The next is the *Tœnioglossa*, bent-toothed, including the greater part of the fresh-water snails. The *Ptenoglossa*, feather-toothed, are a small group, of which the *sealaria* is a member. The *Rhipidoglossa*, needle-toothed, comprise a large number of sea-snails, and a few operculated land-snails. The last is *Docoglossa*, chevron-toothed, and includes the limpets."

Some snails present a pavement-like form and arrangement of teeth which are often of a very pretty pattern, or again a mere hardened mass.

We have thus given briefly the outlines of a study of the teeth of invertebrates, merely to indicate the extent of the subject, and to suggest the interest and attractiveness there is in its pursuit to the naturalist; and in addition to this, to suggest that the study of invertebrate odontology has a positive value to the comparative dental anatomist, from a philosophical stand-point. As a leaf from the great book of nature, it unfolds to us many of her beauties and wonders, and it is also pregnant with suggestions to the dental student who follows his subject out into all its branches. So we find in this branch varieties of form and adaptation to purposes which are not paralleled in the vertebrates. The study of their forms and fitness to perform particular duties is full of interest and surprises, in the fertility of design which nature exhibits.

Of homologies with vertebrate teeth there are few, as the jaws of the articulates work horizontally and those of vertebrates vertically. In the few instances of invertebrates which have vertical jaws, those parts are armed with beaks and the teeth are situated farther back on the odontophore. The teeth of the sea-urchin have true sockets and alveoli, but their arrangement, support, and motion are very different from those of the vertebrates; so that taken altogether the class presents few homologies with vertebrates, or even resemblances to them, and thus affords a variety of illustration that the latter does not supply.

THE GENESIS OF THE CONTOUR FILLING.¹

BY GEORGE S. ALLAN, D.D.S., NEW YORK CITY.

So generally accepted is it by the profession at large that the contour filling represents the highest development of the art in conservative dentistry, that it is as much as a man's reputation is worth to say a good word for the old-fashioned face filling of years gone by. Practice and precept, it is true, do not always follow the same road; still it is a healthy sign of growth to see the highest ideal kept well in the foreground in all our discussions and writings. No subject has been so well and so ably handled, by the wise men in our profession, as the one that presses the claims and advantages of contour work. So true is this, that he who would start on the hunt for one single brand-new thought or idea on the subject would have a weary road to travel and have little to show for his time and trouble when he came to foot up his returns.

At the best he could only hope to attract attention by giving some more beautiful or apt illustration to some well-worn idea or principle that had already become the common property of all. So I turn aside from this uninviting field of labor to another,—one more practical, and I hope, therefore, more interesting, and will confine my thoughts entirely within the lines marked out by the title of my paper,—the genesis of the contour filling, or how it is made.

And this I do for the further reason that, so far as I know, the cardinal rules to be kept in mind in this kind of work have never been presented to the profession in short compass.

Even within these lines, I doubt much whether I can give you much that is new. Still, I think a little less attention has been given to practical instruction in building up the contour filling than to preaching about its many advantages and beauties. This close attention to one thought will also preclude entering into any discussion as to when and where to attempt the full restoration in the shape of the tooth under treatment. Individual judgment largely controls practice in all cases, and the wise dentist, like the wise physician, always adopts the elective motto. The wisest short law I have ever seen pertaining to this point came to me in a

¹ Read before the Section of Dental and Oral Surgery of the American Medical Association held in Washington, D. C., May, 1891.

private letter from an acknowledged authority on the subject, and sums as follows:

"To understand me more completely, I would state that I have not for a considerable time been in favor of inserting very large gold fillings in this manner, and for the reasons you have given in your paper, that the structure and elements of the tooth are not such as to promise a durable retention of the mass of gold by the weakened tooth. But for medium-sized and small cavities, I am equally convinced, from long experience and observation of my own, and the work of others, that no other method offers the same degree of permanency or usefulness."

By so doing, he placed himself in the position of the philosopher who said he always obtained what he wished for, and added, *sotto voce*, "I take good care never to wish for what I cannot obtain."

Taking up, then, the building or making of a contour filling, a threefold division of the subject naturally presents itself,—

1. The preparing of the cavity.
2. The placing therein of the filling material.
3. Finishing and polishing the completed work.

Now a good deal that may be said about the preparing of the cavity will apply to the simpler and easier operations of face and crown fillings; but this one wide difference must be constantly kept in mind,—viz., as the size of the cavity increases, the difficulties and dangers increase, not proportionately, but in a geometrical ratio, and therefore a relatively greater care and attention must be given to all the details of the larger and more complex operation. A few quick, sharp cuts will suffice for preparing a simple crown cavity, but they would fall far short of filling the bill in any case that we propose to consider this evening.

As the architect or engineer sees his completed work before the actual is even started, so should the dentist be able to discern the full size, shape, and figure of his proposed restoration, and each step should be so carefully planned and made to fit the next that, in the completed whole, nothing may be wanting.

Very much of success depends on bearing this safe rule in mind. In fact, it is difficult to conceive how one can plan wisely unless he does. On the size and shape of the cavity, on the proper distribution of retaining undercuts or pits, so as to protect and strengthen weak walls and throw the burden on strong ones, much good judgment can be placed, and the writer is convinced that just here may be found the cause of many failures. Undercuts are made too

deep, and retaining-pits made in such positions or manner as to either weaken the tooth or endanger the pulp. Deep undercuts, though they make operations easier, are seldom called for, and endanger the completed work, and this they do in two ways,—first, by weakening the walls of the cavity, and secondly, by making real obstacles to forming a homogeneous, well-packed filling.

The deep undercut, though it holds the great bulk of the gold in place, is itself difficult to fill. To do so well takes much time and care and the use of exceedingly small pluggers, and this they may not receive. Where all the walls of a cavity are standing, and the face of the tooth adjacent to the cavity is perfect, the walls of the cavity should be left as nearly parallel as possible, and no pits of any kind made. In fact, nearly parallel walls should be the rule, and pits always avoided, when possible.

The real study and judgment is called for in those cases where the natural face or faces of the tooth have been lost, either by decay or the too free use of the file and chisel, for, as will be referred to a little later on in speaking of packing the gold, a point of considerable interest and value arises in these cases, as to whether the filling should be allowed to overlap the walls of the cavity, and simply lie against the face of the tooth on the outside, or shall be made continuous with the walls of the cavity, and bulge only from the cavity itself.

Believing fully, as I do, that overlapping gold is gold in a dangerous position, I would strongly advocate such a preparation of the cavity as will minimize this danger, even if, by so doing, the full realization of our ideal in contouring be not carried out.

It is a sort of belief with many that, in all cases, the packing of the gold should be commenced at the cervical wall or base of the cavity. This is a mistake. Oftentimes more certain and rapid work can be done by starting the filling back in the grinding surface, and building downward. And so this point should be considered, and the cavity shaped accordingly.

As the enamel forms the edges of most large cavities, its proper management is a point of interest. Long ago I advocated, in a paper read before the New York Odontological Society, the complete removal of the thin edge of enamel often found at the neck of the tooth; and this I did for the double reason that it was only slightly adherent to the dentine just there, and so liable to split off during the operation of filling, and, secondly, it was very difficult to make a smooth edge on it.

Since that date I have seen no reason to alter my judgment in

respect to this method of practice, but have had many confirmatory ones brought to my notice. Leaving the thin edge leaves a weak spot, and that is bad.

A final point to observe in shaping the cavity consists in making the edges smooth and polished, and just here the great advantage of the dental engine, with its rapidly revolving bur, comes to the front. No hand instrument, no matter how much care is used, can compete with it. A sharp, well-cut bur will do in a few minutes far more effective and perfect work than the sharpest hand-instrument can in a far longer time. If, in addition to the bur, the edges are polished with the wood point armed with powder, or still better, with an uncut round, soft-iron point, armed with diamond dust, perfect edges can be quickly obtained.

We come now to what many will think the most important part of the work, and the one in connection with which probably more science and skill can be employed than in any other. Two great essentials are to be here considered,—the perfect adaptation of the gold to all the walls of the cavity, and the accomplishing this with a minimum amount of force; and a third may be added,—that the filling be made homogeneous and solid throughout.

Imperfect adaptation makes failure almost a certainty, and undue force (and by this I mean any amount of force over and above that required to condense the gold) is almost equally fatal in the end. How, then, first of all, shall we proceed to make the gold fit the cavity?

The quality in gold that we make use of in building up a filling of this character—viz., its welding property when pure and freshly annealed—is not one that can be trifled with. It is our servant if we handle it rightly; our master, if we slight it in any particular.

In skilful hands pure gold is almost as pliable and obedient to the touch as the clay the sculptor uses to fashion the child of his fancy, but there is this difference: the clay can be worked over and over again,—a little added here, and as much taken off there,—and so long as it is kept moist, it responds to the brain back of it; but not so with gold. Place a bit in position in such a manner as to insure perfect contact with that already in place, and the union will be perfect, and it becomes a part of it; but you cannot try a second time; the first is the only one that will be allowed you; if it does not take its proper position at once, you may be sure that something is wrong, and you cannot make that wrong right by using extra force. The moment that it is done, the evil that resides in the metal and that heretofore has been dormant, manifests itself. It

becomes stubborn, brittle, and cranky, and will not do anything you want it to do, but will persist in doing everything you most object to,—like some individuals, it has a dual nature, and we must beware how we call out the perverse side.

Then, again, the amount of force used must always be proportionate to the size of the pledget to be packed, and exactly, too; not enough force fails to insure solidity, and too much has a tendency to bring out the harsh qualities alluded to. As the pledget must be packed in the exact position in which it is first placed, and cannot be moved from it, great care and good judgment are required to avoid pits, and to make certain that the surface is kept even, for it is much more difficult to fill a pit or sharp depression than to continue a flat surface, and the permitting of pits near the walls of the cavity is especially to be avoided, for the extra force necessary to fill them too often weakens the walls or even crumbles the enamel. So the rule to be observed is to, as far as possible, carry a uniform surface upward, and as the filling grows keep the marginal portions a little in advance of the centre.

Another advantage that results from this plan of procedure is that it makes more rapid work possible, in that you can use larger points. A pit or depression near the walls necessitates the employment of small points, for the point in use must always be a trifle smaller than the pit to be filled. This suggestion is by no means an unimportant one, and a little thought will soon convince one of that fact. The correct packing of gold is, in truth, an art of itself, and requires an educated touch and correct eye.

The celebrated painter, Meissonier, always took the greatest care of his hands, keeping them scrupulously clean, and even tender, by the constant use of gloves. He said that a painter's touch must be most sensitive and delicate. So it should be with the dentist, and he ought to be just as careful and particular. Long finger-nails or callous finger-tips are to be avoided.

Where to start a filling is a matter of some moment. It is generally commenced at the cervical wall, but cases frequently occur where the commencement may be made with advantage back on the grinding face of the tooth, and the filling carried backward or forward to the floor of the cavity. An advantage frequently arises from this method, for, by carrying the gold along the sides of the cavity towards the bottom, any movement of the gold is avoided, and pits to accomplish this same purpose are not required. Any one who has not tried this plan will be astonished to find how frequently it facilitates the operation. Deep pits, in the writer's opinion, are

great nuisances, and are only admissible when other means fail to accomplish their purpose.

What has been said regarding the manner of making a filling leads naturally to a consideration of the points to be used, their shape, and the best methods of applying the force necessary for condensation of the gold. If the gold is to be built up layer by layer, in a series of planes, the points themselves, in fact, should have flat surfaces, and this will be found to be a correct statement. The late Dr. Varney was the first to incorporate this principle in a series of pluggers especially intended for packing cohesive gold, and the set made from patterns furnished by him to this day stand unequalled for their special adaptation for contour work. The points all have plain surfaces, and are very finely and evenly serrated. Slight modifications only have been made in them since his day, so completely did he work out his theory in steel.

A round point may have some limited utility at times, but never can be relied upon to any extent. It would be a matter of the greatest difficulty to make a large, uniformly-packed filling by their use only. Deep serrations are faulty in that they cut the gold and require extra power to force the gold into a solid.

How to apply the requisite pressure is now to be considered, and possibly it is the most important consideration of all. How to apply just enough force for the purpose, and to apply it quickly and uniformly and evenly. How to apply the "quantum sufficit" and no more, and in a manner to give your patient the least discomfort and lighten the labor of the dentist, is a serious problem.

I take it that few would seriously consider hand-pressure alone as offering the best solution. Let alone its being the most laborious and tedious method, it rarely produces perfect work. We cannot get along without it, especially in commencing operations; but good judgment and good work alike demand that it be supplemented by some means more under control, more direct in its action, and developing more power; and this can only be done by resorting to some one or more of the various devices which the ingenuity and thought of the profession has placed in our hands for utilizing the power of the momentum, or, in plainer terms, the mallet.

The late Dr. Atkinson, whose memory we hold in respect, and whose loss we deplore, was probably the first to suggest this means of obtaining the desired end, and in his hands, and in the hands of his followers, the hand-mallet was made to do most excellent service; but it was soon found that it offered only a partial solution of the problem; to mallet for one's self was awkward and oftentimes

impracticable, and the impossibility of making two brains work in harmony made the assistant malleter as often a nuisance as a help; and careful operators soon gave it up as being impracticable. The automatic mallet, in some of its various forms, took its place, and so well did it do its work that it will probably always hold its own and retain a well-deserved place in the dentists outfit. Then followed the electric mallet, a step in advance, and a big one; but it had many inherent defects that greatly impeded its general adoption.

To-day the mechanical mallet is slowly but surely coming to the front, and the writer feels certain that the day is not far distant when it, in some of its modifications, will supersede all others, and for reasons that will now be stated as clearly as possible.

Let it be premised that the more closely the force required can be made to simulate hand-pressure the better it will be in all ways, —safer for the tooth and easier for the patient to bear. Now, this is just what the mechanical mallet does,—in truth, it is pressure intermittently applied, and in nowise is to be likened to the hammer-like blow that is given either by the hand-mallet, the automatic, or the electric.

Take a look at the mechanical mallet in operation and notice how it works. You will see that the point is placed in contact with the gold and gently pushed forward. This throws the farther end of the mandrel holding the point back, so that the lug or rounded bit of steel, with which the rapidly revolving wheel is armed, comes in contact with it, and it is pushed forward, and this is repeated with every revolution of the wheel, so that from one thousand to three thousand impulses may be given to the point every minute, the direction, number and power of these impulses being perfectly under the control of the operator.

In the mallet I employ, which is the Bonwill mallet, as modified by Dr. S. Perry and Mr. Weber, there are eighty threads to the inch in the adjusting screw, and forty notches in the collar, so that a movement of the collar one notch brings the plugger mandrel one thirty-two-hundredth of an inch, or the thickness of the diameter of a human-blood corpuscle, nearer to or farther away from the revolving wheel, and yet small as this distance is, it is distinctly appreciable to the operator and patient alike. Does it not look reasonable that a forward push movement of the point, through these small distances, must be comparatively safe and can be made to expend itself in the packing of the gold, and the packing only?

A valuable point I have observed is that where the serrations of the point are rightly made,—that is, having one side longer than the other,—the point travels over the surface of the filling and has simply to be guided by the operator, so that if placed near the centre of the filling, it will move over the face of the gold in just the direction and manner required; thus it becomes the easiest thing in the world to pack towards the walls of the cavity. The gold is plastered in position, as it were, easily and rapidly.

The kind and quality of the push can be regulated in several ways other than by the adjustment collar,—by increasing or diminishing the speed of the motor, a great change is at one perceptible, and again, the educated touch will hold the point against the gold so as to insure perfect packing, and no force wasted. In fact, through a wide variation of power, it is under perfect control.

A few words, in closing, on the finishing. This is a matter of detail, and often of sad neglect. Too high a polish cannot be given to the perfected work. Do the best we can, and we will fall short, far short, of Nature's model. Time and labor cannot be thrown away, if intelligently employed in the finish.

I mentioned, in speaking of packing gold, that solidity and homogeneity were essential considerations. I grant that a filling that is hard enough to resist pressure, and is perfectly adapted to the walls of the cavity, will prove effective; but perfect adaptation and the requisite hardness, as a rule, also mean homogeneity; not always, though; yet I feel certain of my position when I say that it is not only far easier to finish a uniformly dense filling, but that the work can be done in a shorter time, and always in a more satisfactory manner. I know of no more discouraging labor than that employed in attempting to put a finished surface on an imperfectly packed filling.

Where a tooth has been mutilated by disease, or the file and disk, a question often arises, as before mentioned, as to whether the gold shall be allowed to overlap the edges of the cavity, or simply be rounded out from them. It is doubtful whether gold can be made to lay against tooth-substance in such a manner as to prevent the ingress of fluids. The thinner and wider the overlapping gold, or the thinner and deeper the overlapping gold, the greater the doubt and uncertainty. If the diameter of the gold is one-third or one-half greater than that of the cavity, we may be almost certain of trouble in the near future.

The difficulty in making a perfect edge is also greatly increased in these cases, and so it is a safe rule to observe to finish the gold

to fit the cavity, and to take the place of an overlapping lid as little as possible.

In shaping, the articulation should be always left in such a condition that the filling should, in mastication, be pressed back into the tooth, not out from the cavity.

As a means of education, I know of nothing superior to making fillings out of the mouth. Any one who has not tried it will be surprised at the amount of instruction that can be acquired in this way, and in no other. Any earnest worker who makes the experiment will be astonished to find, not only that the operation is not easy under these simple conditions, but as he aims for perfection, how difficult it is to attain. His edges will remain imperfect, and his powders will scratch, and he will wonder how he ever succeeds in the mouth.

To sum up: In preparing your cavity, be careful to avoid deep undercuts or pits, and throw as little strain on the enamel as possible, and make clean, polished edges. In packing the gold, bear in mind that your filling must be homogeneous throughout. Perfectly fill the cavity and build up in a series of planes, and in finishing imitate nature in the high polish you put upon your work, for, do your best, you will fall far short of her beautiful handiwork. To do perfect contour work requires care and skill. With practice and experience one will be surprised to find how often the impossible becomes possible and the difficult easy of attainment.

A DISCUSSION OF THE FEE PROBLEM.¹

BY WILLIAM BARKER, D.D.S.

PRACTITIONERS of dentistry may be likened to travellers on the high-road of ancient Thebes, to whom the Sphinx propounded her riddles.

We cannot long travel the high-road of dentistry without encountering the Sphinx, who will propound to us, not a veritable riddle, it is true, but a problem on whose satisfactory solution no small degree of our peace and success must depend. It is the fee problem. Fortunately for us, our modern Sphinx imposes no death penalty for

¹ Read before the Academy of Dental Science, Boston, April 12, 1891.

failure to solve the problem, and we are permitted to pass on, ever revolving, and, as yet, rarely solving the problem either to our own or the entire satisfaction of all our patients. *Œdipus*, we know, solved his riddle, whereupon the Sphinx destroyed herself.

We have no expectation of discovering to you a modern *Œdipus*, and only hope to say something which may help to place the whole question, if possible, on a more nearly scientific basis than it at present occupies, for we are persuaded that in a matter involving the reciprocal obligations of performer and receiver of professional services, there may be some way of arriving at an equitable, and possibly scientific, theory of adjustment of the ever-recurring problem of where the claims of a performer of professional service to remuneration cease, and where the obligation of the recipient of the service is discharged.

It is admitted at the outset that our problem contains factors so numerous, varied in character, and uncertain of validity, as to make a strictly scientific balancing and adjustment of them reflect itself in an equation, in any given case, not only exceedingly difficult, but perhaps impossible.

The conundrum of the street or club we may decline to consider at all, or, if found too difficult on consideration, we may give it up; but when any act or procedure in which we are participants, and of which goodness or badness, justice or injustice, may be predicated, is presented for our examination, as moral beings we may not absolutely decline its consideration because of its perplexing nature or the apparent hopelessness of arriving at a correct solution. Remembering how many problems of science, of geology, of astronomy, chemistry, or music have only been solved after many years, and as the result of the connected efforts of recurring generations of students, we may serenely proceed to the study of our theme or problem, confident that the truth, if any shall be presented, will be garnered, and the chaff of error be scattered by the winds of criticism.

If John Doe, as a farmer, ploughs, plants, and tills a field for Richard Roe, and receives remuneration therefor, he is said to be an earner of and a receiver of wages. If John Doe, as a lawyer, draws a will or prepares a brief for Richard Roe, or if, as a physician, he tends him during a fever, or if, as a dentist, he fills his tooth, removes a ranula, or constructs for him an artificial denture, and receives remuneration therefor, he is said to be a professional man, and as such, to be an earner of fees. Why this distinction without any essential difference it would be interesting to know.

The word fee, in the sense in which we here use it, as payment for service, is a word of Scotch origin, meaning cattle. Cattle were used as currency, or a medium of exchange, in the same way that peltry, shells, gold-dust, and other articles of general desire or value, have been employed by rude and primitive people at various times. Cattle, or fe, fee, fey, fie, feoh, were essentially money, as we now use the term and employ the article, and when service of any kind was rendered, it was paid for in fee or in cattle. How the term came to be restricted in its use as at present, we have been unable to ascertain. We apprehend, however, that the distinction in terms, without any essential difference in meaning at any rate, is perpetuated, and finds its chief support and value for many in the fact that in the *popular* mind a more or less hazy idea exists that somehow more honor attaches to the earning or receipt of a fee than to a wage or salary.

The term fee *is*, however, employed as descriptive of remuneration for a much larger and *less* honorable class of services than at first thought is apparent. Lawyers and doctors, horse doctors and corn doctors are paid in fees. Whoever performs the marriage ceremony, be the person a church or civic functionary, is paid in a fee. Court officials are very generally paid in fees. Pilots are paid in fees. We are said to fee the waiter or the chamber-maid, and when we conform to the porter's idea of a *real* gentleman we bestow a fee, while the stud stallion, the herd bull, the autocrat of the kennel, the monarch of the sheep-fold, and other domestic animals kept for breeding purposes are, in that capacity, said to be earners of fees for their owners.

Nor is the fee, as is quite commonly supposed, arbitrarily fixed by law or custom as payment for a definite service. John Doe, the farmer, receives wages according to the size of the field he tills or the time he works.

The fee of John Doe, the lawyer, is supposed to correspond, approximately at least, to the length or difficulty of the will or other document he draws, but it is commonly modified by the ability or willingness of his client to pay, or, what is the same thing, is gauged by the *value* of his services to his client.

What we desire more particularly to examine, in this paper, is whether the price, or fee, which is demanded for a service should be gauged by its *cost* or its *value*,—*i.e.*, should cost be the limit of price, or should value be the limit, or a factor even, in determining price?

The adoption of a standard of weights and measures secures not

only a ready means of determining the exact relation of quantity existing between two or more portions of any material, but it *helps to secure*, as a secondary result, in the vast bulk of commercial transactions, substantial justice between buyer and seller. Poor judgment, innocence, inexperience, or even ignorance, finds in the standard a ready means of determining the exact quantities, if not the relative *values*, of commodities to be exchanged without being compelled to assume a defensive or suspicious attitude against chicane or unscrupulousness.

We say the standards of weights and measures *helps to secure justice* in commercial transactions.

A standard *based on equities* is required, however, to supplement the material standard.

Let us employ an illustration to make our meaning clear:

Eliminating needless factors and complications, let us assume Brown and Jones to be men of equal natural capacities in all directions. Equal application to any given occupation or art would result in equal efficiency in each. They are both fishermen. Brown, influenced by environment, devotes *his* time and energies to catching cod. Jones, likewise determined by his environment, catches bass. Should they desire to ascertain the relative weights of a cod and a bass, recourse would naturally be had to the scales as a standard of weight.

If we now suppose them to be catching fish for their own consumption, there being no outside market, and that neither is content with one variety of fish, and they desire to exchange with each other the catch of any day or week, what ought to be the basis on which the exchange should be made?

To use the scale now would only be to determine the relative weight of the two catches, not assisting even to determine their relative *worth*, which must be determined by a different standard.

Is it not apparent that, as between these two men, if neither is to gain any advantage over the other, if one is not to get something for nothing, while the other is to get nothing for something, the exchange must be made on the basis of cost? And supposing the amounts of cost, measured in time, wear of tackle, etc., and repugnance overcome, to be equal, one week's catch of cod ought to exchange for one week's catch of bass.

In such a case as we have been supposing, it would be an easy, and in time probably a natural, step for Brown and Jones to establish and recognize, for convenience in exchanging less than a week's or a day's catch, a relation of value compared conveniently in weight,

but really measured in cost of production between the two kinds of fish, in much the same way that the relative values of gold and silver are established by law,—about one to sixteen.

At bottom, the relation is seen to be based on relative cost of production. A given amount of labor applied to the production of gold yielding one, and an equivalent amount applied to the mining of silver producing sixteen, those quantities are said to be equal in value, and exchange freely on that basis.

Cost, then, if it can be ascertained, furnishes an equitable and approximately if not a perfectly scientific measure of price.

To say that a thing is worth what it will bring, to employ the language of the market, is to say not only that value is, but that it should be, the measure of price; is to say that we may, because we can, demand from a furnishing man for the measure of wheat which has cost an hour's time and labor, and the overcoming of some slight repugnance to produce, a price equivalent to many hours or even weeks of time and labor and the overcoming of intense repugnance.

The necessities of the would-be consumer of our wheat is a factor we have not to consider, and may not take advantage of. To do so is to get something for nothing; is to appropriate as an idler, and by means of essential compulsion or duress, to our own use, the rewards of another's industry.

The ability or willingness to pay, or the necessities under which a purchaser rests, we repeat, are not factors which the seller has a right to consider or take advantage of.

The practice which many dentists more or less covertly pursue, as they say, "sizing a patient up," to estimate how heavy a fee he will stand, of course violates the equities, and places the adjusting of fees on the low plane occupied by the bully, who overrides the rights of all not bold enough or strong enough to thrash him.

These same men expect to pay no more for a pound of steak or sugar, for a book of gold, or an excavator, than would be demanded of a day laborer or a poor student for the same thing. "One price to all" is not the general commercial practice because of its convenience so much as because of its justice.

In fact, when we study the subject and familiarize our minds with the equitable harmonies likely to grow out of the general adoption of the cost principle of price, and contrast it with the injustice, the blunting of moral perceptions, the fostering of greed and avarice, and the embroiling exaltation of self at the cost of others' necessities, involved in the adoption of the principle that a

thing or a service is worth what it will fetch, or that value should be the measure of price, we are convinced that, as a rule or standard for the fixing of fees, the cost principle would prove itself valuable, convenient, scientific, and satisfactory alike to all patients and operators who believe in reciprocity of service and mean to practise the virtues involved in a *quid pro quo*.

We have here indicated a *rule*, the general adoption of which by buyer and seller, between the performer and receiver of service, would tend greatly to increase the sum of human happiness, and to check, in great measure, the growth of those two classes so dangerous to modern civilization, the millionaire and the tramp, would tend to abolish involuntary poverty, and make the fear of poverty by the industrious a shadowy dream.

A word as to the obligation imposed on believers in the cost principle to put it in practice.

At the first blush it seems to be an *inexorable law*, binding on the conscience and demanding instant obedience; as if no man unwilling to receive more benefits than he confers could continue to receive profits, or, more accurately speaking, could longer continue the practice of fleecing his patients or patrons.

This impression will vary with the varying mental and moral make-up of different individuals. It becomes a question of casuistry which each must decide for himself. "Absolve thee to thyself. Nothing is finally sacred but thine own integrity."

"In the first place, let us remember that it is impossible, in the nature of things, to apply a principle the essence of which is to regulate the terms of reciprocity where no reciprocity exists."

The equitist, who should sell on the cost principle and be compelled to buy where that principle was ignored, would soon be compelled to put up his shutters, and the campaign for justice and reciprocity would be waged, if at all, without him. Conservation of one's own energies is essential in a long race and a protracted fight. He who wars against the world single-handed, he who swims against the current alone, is likely to sink, without affecting aught save useless labor and sinful sacrifice.

The farmer living in a section of country overrun with Canada thistles, who should attempt to exterminate them from his own farm by confining his efforts to his own acres, might be expected to succeed as well as he who should attempt to inaugurate a system of fees based on the cost principle, but which none, or few others, in the community appreciated or recognized.

If we have thus far made our meaning clear, we shall perceive

that the fee which may be rightfully demanded for a dental service will be, ideally, an exact equivalent for the time, labor, skill, and repugnance overcome in the direct performance of the particular operation, also the time and labor, or their equivalent, *indirectly* expended or consumed in the performance of the service while pursuing preparatory studies and acquiring the requisite qualifications to perform the service at all. If, reckoning in each and every factor legitimately contributing to the perfected service, we find it represented, say, by twenty, then that is the measure of the fee we may demand, no more no less.

The president of one of our leading universities, in a recent public address on socialism, expressed the wish that the hope of the socialists could be realized, but affirmed his disbelief in the practicability of the doctrines, because, among other reasons, as he thought, of the impossibility of arriving at the labor cost of productions.

While we admit the force of the objection and concede the impracticability of reaching in every case an exact measure of the absolute and ideal cost of dental operations, we yet contend that an honest *attempt* to do this is much more likely to secure the measure of an equitable fee than is the too prevalent method of sizing a patient up by the clothes he wears, the house he lives in, or the equipage he drives.

We contend, *at least*, for a reasonable correspondence between cost and price.

Criticism will converge upon the word reasonable. What is to be considered reasonable?

An excavator twelve inches long all would agree was too long to be convenient, while one only three inches long most of us would think too short to be useful; and while as to the length of his excavators as well as to the amount of his fees each dentist will and should be his own judge, yet in determining the amount of his fees he should be governed by other considerations than his own narrow interests or desires. It must be borne in mind that cost is the rightful limit of price.

We are of the opinion that twenty dollars per hour violates a reasonable correspondence between cost and price in one direction, and that two dollars per hour violates it in the other direction; fifteen dollars per hour, as a constant price, we are inclined to opine still violates the reasonable correspondence we are contending for, while ten dollars per hour as a constant price comes in our opinion perilously near it. "Let every man be fully persuaded in his own mind."

We think the time basis of fees, as a rule, can be made to more nearly harmonize with the cost principle of price than a system based arbitrarily on minimums, or the size of cavities, or the materials employed, or all combined.

We believe it to be inequitable, as well as unbusiness-like, to tacitly or openly and avowedly perform any beyond the most trivial service without a fee, with the covert or open intention of "getting square with them" at some other sitting, or, as we have sometimes heard, of getting it out of somebody else. Let every tub stand on its own bottom.

If we extract teeth and insert artificial dentures, let each be the subject of a fee, as much as would be the case if we amputated a leg and supplied a cork substitute, or dug and walled a cellar and afterwards erected a house over it. The busy dentist unquestionably should receive a fee for broken appointments, for a reason so obvious it need not be indicated. Fees for services to children, if conformable to the cost principle, should at least be as large as for adults, because of the ordinarily greater degree of repugnance overcome in serving them.

Conformity to the cost principle would very generally considerably increase the fees for work on devitalized teeth and for cleansing. The disproportion between cost and price for services in regulating, to the average dentist, has always been cause for legitimate complaint.

But our object is not to discuss specific cases, but to unfold a principle by reference to which cases may be adjusted as they arrive.

One thought more. The exaction of too high fees, not only drives patients away from the practitioner exacting them, but not infrequently influences them to forego the benefits of dentistry to a harmful extent. Flying from the competent and honest operator, but dishonest fee-maker, the tendency is towards the quack operator and quack fee-maker. Scylla on the one hand, Charybdis on the other, as they make the course. Many, it is true, wisely steer the middle course, and are faithfully served as to operations and honorably dealt with as to fees.

A reasonable correspondence between cost and fees, if not in every case swelling the purse as would a fee violating that correspondence, on the high side, will yet, to the equitist at least, yield reasonable satisfaction and greatly tend to enlarge the field over which the benefits of dentistry shall be enjoyed.

DENTAL ORGANIZATIONS.¹

BY WALTER HARRISON, L.D.S., D.M.D., BRIGHTON, ENGLAND.

I HAVE often thought that the large number of dental societies in the United States of America would lead to better results and saving of energy if they were branches of a national association, as the American Dental Association. Not being with you, I do not wish to draw comparisons, but I should like to give a brief outline of our leading organizations in England.

In all instances the teaching is conducted at a hospital, either a special institution or the dental department of a general hospital; that is, the general public recognize the necessity of dental operations in the poorer sections of the community, and liberally support these charitable establishments by means of voluntary subscriptions, donations, or legacies. Dental hospitals are now fully recognized as one of the charitable institutions of the country. The point I wish to emphasize is *the public interest*. The Committee of Management is elected from and by the subscribers, and the public financial support is relied upon more than fees from pupils (there exist dental hospitals and departments which are conducted by the honorary dentists only, no student being admitted). In return for the subscriptions the benefactor is entitled to a certain number of "letters of recommendation," to be presented by the applicants for special operations,—viz., fillings, anæsthetic operations, regulation cases, etc.; ordinary extractions, and cases of accidents, fractures, etc., are admitted without such introduction.

The minor details of the working are similar to those with which you are familiar. There exists the hospital and school, engaging really in same work and building, and co-operating with perfect harmony. Nearly all offices are honorary and are eagerly sought after by young practitioners, and are looked upon as positions of distinction.

The dental surgeon appointed to general and special (not dental) hospitals occupies the same position as the physician and surgeon. Nearly every medical charity in the United Kingdom has upon the staff an honorary dentist.

After the Dental Bill passed and became law, the "Reform" Committee resolved itself into the British Dental Association.

¹ Read before Harvard Odontological Society, November 29, 1890, by James Shepherd, D.M.D., Boston, Mass

EXTRACTS FROM MEMORANDUM OF ASSOCIATION AND BY-LAWS.

The objects for which the Association is established are the promotion of dental and the allied sciences, and the maintenance of the honor and the interests of the dental profession by

"The periodical meetings of the members of the Association and the dental profession generally in different parts of the country.

"The publication of a periodical journal, and by

"The maintenance of the spirit and provisions of the Dentists' Act, by such lawful means as may be necessary, etc."

EXTRACT FROM THE BY-LAWS.

"A person who is registered in the Dentists' Register shall be eligible for election as a member of the Association, provided that he be of good character; that he does not conduct his practice by means of the exhibition of dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show-case exposed to public inspection; or by means of public advertisements or circulars, describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges.

"Any registered practitioner not disqualified by any by-law, who shall be recommended as eligible by any three members of the Association (the recommendation of one being from personal knowledge), and who has signed the appended form of application for admission and agreement as to terms of membership, may be elected a member by the Representative Board or by a committee appointed for that purpose by the board, or by the council of a recognized branch."

The subscription is one guinea per annum, and each member is entitled to a copy of the journal of the Association monthly, and to attend the annual meetings of the Association.

The Association is the real representative of the profession, and is divided into eight (at present) branches, each having a president, secretary, and council (for all practical purposes they are societies in themselves).

The meetings of the various branches consist of the annual meeting for election of officers, etc., and to fix place of next gathering, in addition to the regular programme usual at such societies. Minor meetings are also held according to the demands of the district.

The Association also possesses a Benevolent Fund to aid distressed dentists' widows and orphans.

The Representative Board consists of all the presidents and secretaries of the branches and a certain number of members elected by ballot, who are the body of the Association.

One of the most important features is the possession of the Dental Journal; thus for about \$5.25 annually a member is really a shareholder in the publication.

It must not be supposed that the British Dental Association is the only society we possess, several of the larger towns having one, and are able to maintain excellent scientific meetings, but at the same time the British Dental Association is represented everywhere.

Personally I should like to see the American and Southern Dental Associations become one body (*vide* INTERNATIONAL DENTAL JOURNAL, September, 1890), and every State society become a branch of the American Dental Association, publishing a journal of its own.

The degrees are granted by the various colleges of surgeons, and their diplomas are recognized by the state, so that the possessor of the dental license (L.D.S.), which the law *demand*s, entitles the holder to be registered upon payment of the fee without further and (I consider) unnecessary examination. In my mind the diploma of any of the recognized dental schools should entitle the graduate to practise in any State. If State examiners were to be present at the college examination the difficulty would be overcome.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, May 19, 1891, at the Academy of Medicine, No. 17 West Forty-third Street, New York City.

The President, Dr. William H. Dwinelle, in the chair.

Dr. Perry.—Mr. President, Professor Wight, who recently read a paper before us on the subject of "Work," presents to this Society a little book entitled "Suggestions to the Medical Witness."

Dr. Allan.—I move that we accept the book and tender to Professor Wight a vote of thanks.

Carried.

The President.—Since last we met, as you will perceive, gentlemen, a very interesting osteological collection, probably unparalleled in the world, has been placed in our rooms, collected through the energies and untiring industry, for many years, of our friend Dr. W. C. Barrett, of Buffalo, N. Y. This collection has been purchased of the scientific institution in Rochester, N. Y., where it has been owned, and has, I understand, been presented to the New York Odontological Society by its purchasers, who are, with few exceptions, members of the Society. The collection is to be free to dentists of the world for scientific research. We are all more or less aware of Dr. Barrett's services. He has been untiring in bringing together and focalizing this collection, which has been the contribution of science throughout the world. We have it now in our possession, and we hope and expect that it will be the nucleus for a collection whose superior has never been seen. Dr. Barrett, instead of going to Buffalo to-night, has stayed with us to arrange the specimens in their proper order in the cases provided. We would all like to hear a few words from Dr. Barrett.

Dr. W. C. Barrett.—I only wish that I could persuade myself that I am worthy the kind and complimentary terms which your honored president has used in alluding to me. I love this kind of work; I love this superb collection, and because of that I have spent the last three days in putting it in order. On my arrival I found the cases ready, or nearly so, and I have busied myself in arranging

the specimens in them. The work is not yet completed, for they are but hurriedly crowded in, that they might be exhibited at this meeting.

And now may I say a few words concerning the arrangement? There are certain scientific demands to be met in the placing of such a systematic series as this. It is not a mere heterogeneous collection of objects, but it is a scientific illustration of the various orders and species. There are no duplicates here, but each one has its own definite place in the series. The great grizzly bear and the raccoon belong to the same class, and must be together, though they may to the uneducated eye look ill-assorted. The specimens are not to be put up to look pretty, but that each may best subserve the purposes for which it is intended, in connection with the rest. They are not to be classified according to size or general appearance, but each must follow a scientific and recognized law. The various orders must follow each other consecutively, and the species be properly arranged under them. The whole is intended for scientific study, and it must be arranged accordingly. This is somewhat interfered with by the fact that certain very large specimens cannot be contained in the cases. These fifteen-feet jaws of *Physeter Macrocephalus*, for instance, cannot be placed with the other Cetacea.

The series commences here (illustrating): On these shelves are the Primates, commencing with the species *Homo*, followed by the Simiadæ, Cercopithecidæ, Cebidæ, and Lemuridæ. All the Primates have a diphyodont-heterodont dentition. These are succeeded by the order Carnivora, divided into the Cynoidea, Eluroidea, Arctoidea, etc.

On these shelves are found the Ungulata, divided into the Perisodactyla and the Artiodactyla, and the Ruminants separated from the non-Ruminants.

In this case are the Rodentia in their proper order. Then follow the Marsupialia, the Cheiroptera, the Insectivora, the Cetacea, and Sirenia, and here are the sharks and rays, with the rest of Pisces. Here are the Reptilia and Batrachia, and here is a specimen in Aves,—a fossil bird that had unmistakable teeth.

This case is devoted to the fossils of the collection, and here may be found skulls of the cave bear, connected with the troglodyte period of man; the oreodon, an ungulate possessing peculiar characteristics; a giant rodent, *Castoroides Ohioensis*, and many others, together with a series of casts of long extinct mammals.

This case is made up entirely of prepared specimens; sections illustrating the manner of the insertion of different kinds of teeth,

with the tissues of some arranged in a seemingly fantastic manner, pathological specimens, and rare forms of teeth. In this case are specimens of that curious substance, baleen, or whalebone, that anomalous formation which takes the place of the rudimentary teeth that are found alone in the fœtus of the right whale. It will be observed that some of the cases are crowded very much, while in others there is room to spare. This could not be avoided, as the cases were not specially constructed for the different orders, but were all made of the same size.

The specimens are not yet fully arranged, and there must still be considerable work expended upon the collection. There are no labels for the orders and species, and these must be made. But when it is finally finished, you need not fear to introduce any scientifically educated man, for he will, I hope, find it all arranged according to a definite plan. That method may be a little novel to some scientists, but it must be remembered that this is a dentists' museum, and the individual specimens are arranged to show the dentition.

I do not think that such a collection exists anywhere else, for none has been made, to my knowledge, to illustrate the dentitions of the different orders and classes. I am sure that it will be an inspiration to students, and it will be a credit to you of New York. Its placing here has been a labor of love with me, and my heart will always be in it. I hope to see it grow into greatly enlarged proportion. Dentists should study the scientific aspects of their own specialty, and I want to see the time when it will not be necessary to specify the species when one speaks of the crescentic molars of some of the Ungulata, for all will know exactly to what allusion has been made. All the spare time that I have had since this collection has been got together has been spent in it, and I am only sorry that I have to go so far to reach it.

I have the keys of the cases, which, when the work is completed, will be handed over to the proper authorities.

The President.—Gentlemen, you see Dr. Barrett fully justifies me in all I have said. I think this collection will be a great satisfaction to us all, and will be a means of instruction, and make New York a sort of Mecca to which scientific men will come and study the subjects that are introduced in this collection.

Dr. Barrett.—All work of preparation, placing the specimens on their proper stands, and mounting them, was done at Ward's Natural History Establishment, at Rochester, and the credit belongs to him.

Dr. Phillips.—I move a vote of thanks to Dr. Barrett for coming here and spending his time in arranging this collection.

The motion was carried.

REPORT OF COMMITTEE ON THE DEATH OF DR. ATKINSON.

A man has passed away, one who filled a large place in our profession, and it is fitting that this society should take notice of the event in a proper manner, not in the way of an obituary notice or eulogy, but to place on record a brief statement of our reasons for mourning his loss and reviving his memory.

In life no one was more devoted to his profession than our lost friend. In fact, it was all in all to him, and he threw his very being into it. The best was nearly good enough for him,—never too good. He labored in season and out of season for the advancement of his chosen field of labor, and never knew what it was to spare himself. What he believed to be right he wanted all others to see as he did, and so he was ever a teacher, and always taught that which was best and most true to *nature*, and his instruction was free to all.

As a man he was tender and generous to a fault. Easily imposed upon, but never bearing malice, his house and purse were open to all.

Therefore it is we think of him kindly, lovingly, and hope that the angels he so fully believed in and prayed to when he was with us now minister to him and have lifted the burden from his weary soul, and opened his eyes in a world of bliss.

GEO. S. ALLAN.

BENJAMIN LORD.

A. L. NORTHROP.

Dr. Jarvie.—I move that the report be accepted and entered in full upon a memorial page which shall be set apart for the purpose in our minute-book.

Seconded and carried.

Dr. Perry.—Another great light in our profession has recently gone out. I refer to the recent death of Dr. Edward Maynard. It seems to me that the Society should not allow his death to pass without some recognition of his great services to our profession, and I move that a committee be appointed by the chair to draft suitable resolutions.

Seconded and carried.

The President.—I appoint, as that committee, Drs. Perry, Francis, and Lord.

Dr. Perry.—I think it eminently fitting that our president be added to that committee, and, gentlemen, I put it to the house, if he should be added to that committee; and also that he be made its chairman. He and Dr. Maynard were boys together.

Motion carried.

Dr. Perry.—A request came to us from the New Jersey Society, asking that a committee be appointed to act in conjunction with eight other gentlemen, to get up some suitable memorial for Dr. Atkinson. I think a resolution should be made to that effect, and I move that a committee of two be appointed for that purpose.

Seconded and carried.

The President.—The appointment of that committee will be made at a future meeting.

We will now proceed to the paper of the evening, which will be read by George W. Weld, M.D., D.D.S. I have the pleasure of introducing Dr. Weld.

(For Dr. Weld's paper, see page 501.)

The President.—The subject of Dr. Weld's valuable paper is before you for discussion, gentlemen.

We are so fortunate as to have Professor Elliott, of the College of Pharmacy, with us this evening. We should be very happy to hear from Professor Elliott.

Professor A. H. Elliott.—Mr. President and gentlemen, I must apologize for appearing before you this evening, since I am not a member of your Society; but in the society of science I believe we know no sections. Professionally, I am a chemist, and know very little of the physiological questions that Dr. Weld has so ably expounded; but, some three or four years ago, he interested me in this subject, from a chemist's point of view, and some of his interesting experiments with enamel came to my notice. A short time ago he told me he had been making some further experiments, and asked me if I would make a chemical analysis of the same.

I took a certain amount of enamel,—I will not bother you with figures,—which, in a three-per-cent. solution of acetic acid, was dissolved to the extent of about thirty per cent. A question arose in my mind as soon as I had made the analysis. I had some of the same enamel that I had analyzed three or four years ago, which contained about eighty-seven per cent. of phosphate of lime, and about eight or ten per cent. of carbonate of lime. The result of the experiment with acetic acid was this: I not only determined that a certain amount of this enamel was dissolved, but I went further: I analyzed the solution in order to see if the ratio of dissolved

material was the same as the ratio of those materials in the original enamel ; that is to say, whether eighty-seven per cent. of the dissolved material was phosphate of lime. I do not know whether I told Dr. Weld this or not ; I may surprise him when I say that there was not the same amount of phosphate of lime in the solution as there was in the original enamel, proving to my mind that there was more carbonate of lime dissolved than phosphate of lime. I do not know the particular reason Dr. Weld has in connection with this, but it appears to me that the cementing substance is carbonate of lime, for here we have a fractional solution, the carbonate of lime going into solution more readily than phosphate of lime. If each dissolved as readily as the other, the ratio of phosphate of lime to carbonate of lime would be the same as it is in the original enamel ; but I found that the phosphate of lime comprised about eighty-four per cent. of the solution, while the original enamel contained eighty-seven per cent. and a little over, showing that there was a tendency of the carbonate to dissolve more readily than the phosphate in the short time given, about half an hour.

One other point : I also finished, this morning, another experiment that Dr. Weld asked me to make. He asked me to take the enamel, and just wash it for a few moments with the three-per-cent. acid, and note the effect. Soaking the enamel for half an hour in the acetic acid dissolves, as I have said, about thirty to thirty-three per cent. By merely washing and drowning the acid at once, I found one-eighth of the enamel dissolved ; but I have not yet determined whether the ratio in this case consists of an increased solution of carbonate over phosphate of lime, but I strongly suspect it is so.

With regard to this interesting question of the Vichy water, its effect may be due, as Dr. Weld suggested, to the mechanical separation of the dissolving material from the enamel by the gas, which is a very common result in batteries. If a plate of copper and one of zinc be immersed in sulphuric acid,—I am talking purely from a chemist's point of view,—we will find in a few moments that the surface of the copper, below the fluid, is all coated very closely with bubbles. If into this we place a galvanometer, we will find that gradually the needle will drop off until it gets to zero. The reason of it is that there is want of contact between the fluid and this particular metal.

That is the mechanical explanation of the want of contact, or the want of action of the chloride of iron, in connection with Vichy water.

Another explanation is the possible formation of a sesqui-carbonate of iron, or the carbonate of iron that corresponds to the perchloride of iron. If to a solution of perchloride of iron we add carbonate of ammonia, the fluid may finally contain ninety-eight per cent. of absolute oxide of iron, and one and one-half per cent. of hydrochloric acid.

With care the hydrochloric acid can be made to unite with the carbonate of ammonia, so as to leave a very small amount of acid. Now, we can go further, and dialyze that. Take a solution of iron—peroxide of iron—without any acid in the solution, and with the acetic acid we can carry it down so that every one hundred parts will contain ninety-four, about, of peroxide of iron, and six of acetic acid.

In adding Vichy to this acid solution, it may not only act upon the free acid over and above that necessary to form a perchloride of iron, but it may go still further, and unite with the hydrochloric acid, in combination with the perchloride of iron, forming a percarbonate of iron, and that is possibly the reason for its fluidity and the ease with which it remains in solution.

That is all I happen to think of which has a bearing on the subject, but if there are any questions, I shall be pleased to answer them if I can.

Incidentally, I would like to mention a little experience. Dr. Weld mentioned fluids for cleansing the teeth. As some of you gentlemen may know, I have a good many things brought to me to analyze, and about a year ago a very nice lady came in bringing a solution, apparently clear, which had a slight ethereal odor. She wished me to make an analysis, and give her a certificate that it was not injurious to health. I examined it, and found that it contained eighteen per cent. of concentrated hydrochloric acid. The lady said she was selling a great deal of it for a tooth-wash, but she wanted my certificate that it was not injurious to health. Of course, it was not injurious to health, but it was injurious to teeth. I asked her if she had used it on any teeth, and she said yes, she was using it herself. Her teeth did look very nice and white, but I considered it an outrage that such things should be foisted on the public, and, of course, I did not give her a certificate.

Dr. C. E. Francis.—A lady came into my office not long since, bringing a small vial containing a colorless fluid, and asked if I could tell her what it was. She said that parties were going about down-town selling vials of this kind, at the price of one dollar per bottle, or six bottles for five dollars. It held about half an ounce.

A friend of this lady, a banker, bought six vials for five dollars, and presented them to several of his friends, and she had received one from him. I removed the stopper, and at once observed the fumes and recognized the odor of hydrochloric acid. I then dissolved a little carbonate of soda in some water and added a few drops of the fluid, which immediately effervesced. I informed her of its nature and warned her not to use it. I would remark, Mr. President, that some of the most marked cases of decalcification of human teeth I have ever witnessed have been the result of the action of lactic acid. Within a few days, a gentleman called upon me whose teeth I have watched for a long time, and it is perfectly astonishing to see how they melt away, much like sticks of candy immersed in water. He has been living on a milk diet for a long time, and his teeth are almost gone. They are so melting away that nothing will save them.

A lady brought a little child into the office of Dr. Phillips, one of my associates, some time ago, and was anxious to know why the little girl's teeth decayed so rapidly. Dr. Phillips called me in to look at them, and I observed that the child's teeth were sadly eroded. I asked if her child was taking any solution of iron or eating much acid fruit; she said no; then I asked her if she gave the child milk to drink at night just before going to bed. She replied, "Why, yes. I give her a glass of milk every night." The erosion was undoubtedly caused by the action of lactic acid upon the teeth. In such cases I give caution and advice, hoping to avoid such results.

Dr. E. A. Bogue.—Is this the time at which people ask questions?

The President.—Yes, sir.

Dr. Bogue.—I have been exceedingly interested, since Dr. Weld read his first paper here a couple of years ago, not only in the subject now being discussed, but also in another which he touched upon just as he finished his paper to-night, but upon which I confess myself endarkened rather than enlightened. The point is this: We hear a great deal about the action of acids that are taken as remedies. We hear, also, in this instance, from Dr. Weld, of the action of the salts of iron. I failed to get from him what the indirect action was. He certainly said that the fluids of the body were not changed.—those which were alkaline were not made acid, —but I did not understand him whether the remedies themselves were not discharged through the salivary glands, and left in the mouth in such a state that free acid might be found.

Inorganic medicines, many of them, are decomposed in their passage through the system. If I might understand him more correctly I should be very much obliged.

Dr. Weld.—Mr. President, I thought I made myself clear. I only alluded to that point from a physiological point of view. As I said, chemical observation in the future may determine that the secretions from the salivary glands may be rendered acid enough—if that is what Dr. Bogue means—to affect the teeth, but I do not think that is possible. If it be possible, I should be very happy if Dr. Bogue would explain it from a physiological stand-point. If I understand what the doctor means, it is that the blood is changed from an alkali to an acid by the ingestion of acids (an impossibility), and the acidity of the fluids of the salivary glands thereby increased. I do not think that could be made possible by the ingestion of acids. The tears and perspiration are always acid in reaction, and I think all the alkalies in the city could not change their chemical reaction.

Urine is acid. It is changed because the kidneys eliminate the alkalies. It is changed from an acid to an alkali, but then, as I stated, if the alkalies are stopped, urine immediately returns to its normal acid condition; but it is a very different thing with the blood, which is always alkali in reaction.

That is the point, and I do not see how to go to work to experiment unless it be really by clinical and chemical observation, and that would require a great deal of time; and while I am not able to say, from chemical observation, that such a thing may not occur, at the same time I am inclined to think it an impossibility. If Dr. Bogue will try it on himself and report, I shall be very glad to know the result.

Dr. Bogue.—I did try it, and the result was that the acid was distinctly perceptible in the saliva. I should like to ask Dr. Weld about the experiment of Dr. Chase, of St. Louis. He examined some cows fed on slops, and found that the saliva, which ought in its normal condition to be alkaline, was acid. He took some other cows, fed in the field, shut them up, and found, upon feeding them slops, that their saliva became acid, but upon feeding them hay the saliva became alkaline and remained so during the act of mastication, but after the meal was finished the saliva soon returned to its acid condition. Dr. Weld has alluded to the alkalinity of blood, and also the acidity of the urine after being passed through its process of secretion. Then why should not human saliva change from alkaline to acid and back again? I believe it does. In my own case, although I tried it several times, I did not go through a

series of experiments. I found the saliva acid after using iron for a time, and I see no reason why we should not expect it.

Again, I have noticed the condition of patients coming from the German iron springs; and the amount of dental troubles arising after a course of treatment from these springs is marvellous. Disintegration at the margins of the gums and of the fillings. In the cases of some persons of whom records have been kept for years anterior to their course of treatment, one summer has shown a manifest breakdown. Dr. Weld confesses that he is unable to explain. Perhaps Professor Elliott will help us out; it is a subject of great interest, and one which we are all anxious to hear about.

Professor Elliott.—The gentleman who has just sat down has called attention to the action of mineral waters upon the teeth. There are two classes of mineral waters in which iron may occur. The first of these is a water in which iron is present as a bicarbonate of iron, and in the other case the water contains sulphate of iron. I think I am right when I say the water of Oak Orchard, in this State, is an acid water, in which the iron is in solution in the form of both chloride and sulphate of iron, while the High Rock Spring, of Saratoga, some years ago, at least, contained a bicarbonate of iron.

Now, with regard to the water containing bicarbonate of iron, I think we are in much the same position that we are with the Vichy water and tincture muriate of iron. But with the other waters we have a corrosive agent that is not so easy to counteract. It might be that the water containing the perchloride of iron, as I think many of the German iron springs do, could be safely taken in conjunction with Vichy water, but by drinking the water alone I should think it would be very likely to affect the teeth. If it will dissolve iron, it will very likely dissolve the enamel. A water of that character put into a boiler in which hard water has been used will dissolve all the incrustation. With regard to the secondary action of these acids, a great deal depends upon which acid is in excess. If we take a solution of nitrate of potassium, mix it with acetic acid, and then throw into it metallic copper, the copper will dissolve and give off red fumes, showing that the acid is dissolving the copper to form nitrate of copper. If, on the other hand, the solution be diluted, there would be no nitrate of copper formed, so it is largely a question of concentration.

One other point that occurs to me in connection with the possible advantage of using Vichy water with a tincture of muriate of iron would be that, while it would protect the teeth from any cor-

rosion, owing to the fact that it is there as a sesqui-bicarbonate only, as soon as it gets into the stomach, the hydrochloric acid being so much more acid, the iron returns at once to its original condition as it would be in the original tincture of muriate. So, while the Vichy water allows it to pass the teeth, as soon as it gets to the stomach it returns to its original condition.

Dr. Bogue.—Allow me to express my thanks to the gentleman, for he has exactly answered the question. Now another question: Is anything known by which we may so protect ourselves against this acid reaction, so that we may get the therapeutic effect on the system at large and yet not on the teeth? The direct action I confess to have looked upon almost with indifference. I have failed to see how my swallowing half a dozen oysters with some lemon-juice on them has done me any harm. On the contrary. Yet I should hesitate to expose my teeth to the action of a lemon while I was chewing. I should not hesitate in using muriate of iron if I needed it; but I should expect exactly what was told to us. After it was sent into the stomach and then sent on its journey through the circulation, I should expect that the mucus in the mouth would be intensified in its acidity.

Professor Elliott.—I did not mean to imply that the sesqui-carbonate of iron in passing into the stomach would necessarily cause a secretion of mucous acid in the saliva. I am not enough of a physiologist to argue that point, but I should think not. For we know that, although we may take such substances as cream of tartar, we will find, if we examine the urine, that it will be alkaline. These organic acids are decomposed from the physiological processes, and the alkalies are secreted by the urine, and pass out by the kidneys as an alkaline fluid.

In regard to the question of some method of using these and mineral waters, there is the one already suggested by Dr. Weld,—that is to say, if you have an acid water, mix it with Vichy water to an agreeable extent, or to an extent that shall counteract the direct acid action, and produce bicarbonate of iron. It is difficult to prove that it is so, because it is in solution, and it is in the same condition that bicarbonate of calcium is in the mineral waters. We know that we cannot dissolve carbonate of lime in water to any reasonable extent. We know that precipitated chalk stirred in a little carbonic water will give a perfect solution. I would suggest that an alkaline Apollinaris, Vichy, or any of these waters, could be used containing bicarbonate of sodium in connection.

Dr. Geo. S. Allan.—Dr. Weld very kindly brought me yesterday

one of the teeth he had decalcified in a one-half-per-cent solution of hydrochloric acid, and asked me to examine it microscopically. I took great pleasure in doing so last evening. Taking a small piece of the broken-down enamel, crushing it on a glass slab, and mounting it in the usual way, I found that the prisms were most beautifully separated from one another, and I was able to get a better view of the separated prisms than in any specimen I have ever seen.

There was no question whatever that the cementing substance in the prisms had been dissolved out in preference to any action having taken place on the enamel. The prisms could be seen perfectly formed, with pointed ends and wavy outlines. They were more translucent in character than I expected to see them, but most beautifully brought out. Some of the substance of the prisms had been dissolved, but there is no question but what the action of the acid had been mainly expended in dissolving the interprismatic cementing substances. I do not think these specimens either uphold or militate against the reticulum theory. They have nothing to do with it. So small a portion of organic matter would very easily be lost sight of in a specimen of this kind. It was simply interesting, as showing how very beautifully this weak solution of acid dissolves the cementing substance, and liberates the prisms in their original condition for study.

The President.—I hope that this subject will be still further discussed. Dr. Meriam, of Salem, is with us and we would like to hear from him.

Dr. Horatio C. Meriam.—I think, Mr. President, that the subject must be finally considered in a wider range, not only as it affects saliva from the mouth, but the saliva of different conditions. The saliva during mastication and the mucus that is secreted at other times are altogether different. One has been subject to heat, and the other has been produced by muscular activity and has undergone no chemical change. We must also distinguish between the fluids produced in a healthy circulation of all fluids in the body and those produced during a sluggish condition.

I have questioned many of my patients regarding their condition, when I have found extreme decay at the margins of the gum, and in almost all cases I have found that they were costive. This condition has been connected with mucus so tenacious that it could be drawn from the lips a foot or more before the line broke. If the teeth are coated with a mucus so tenacious and of sufficient acid strength to act on the teeth, that brings us to other questions.

We have another form of erosion that is produced in rheumatism. Two patients I have in mind now, where the bicuspid and all the incisors look as if they had been cut and polished. All the fissures are obliterated. It is clearly the acid from the glands at the end of the tongue acting on these teeth.

I have never felt that the action of iron produced the harm that we thought, because it seemed to me impossible that it should lodge in the positions where we find those cavities in quantities sufficient to make them. "The fathers have eaten sour grapes and the children's teeth have been set on edge," not on the sides; and so I have felt that we should go back to the condition of the saliva, to that of the mucus glands of the mouth, and what produced their condition.

The use of tannin to arrest decay has been advocated. We know that decay cannot be arrested by it, but we believe that tannin could have an action on the glands of the mouth, so that the fluids secreted would be more healthy. In some cases where there has been an erosion of the teeth, showing a corrugated surface, I have stimulated the mouth with alcohol, directing my patients to get a burning sensation night and morning, for the purpose of reaching these glands.

There is another condition,—that coming from the growth of germs in the mouth. Botanists have, I know, advised farmers to sow certain plants for the sake of securing the action of their roots in breaking down the soil, and thus preparing it for a more valuable plant. The roots, as you know, exude an acid which acts on the otherwise refractory soil. It is interesting here to recall the experiment where a plant was planted in a glass cylinder which was placed on a slab of polished marble; after the roots were seen to have reached and covered the marble, the cylinder was removed, and the outlines made by the roots could be traced by the etching caused by their excreted acid.

This subject is an interesting one, and I thank you for calling upon me.

Dr. Barrett.—It seems to me that we are endeavoring to establish from a single fact, or from two or three simple truths, a whole system of philosophy. In many cases we confound cause with effect, misapprehending both. Within my own observation I have never seen anything that led me to entertain the slightest apprehension of evil from any of the mineral acids. We do not find them in sufficient strength, or in such conditions, as to dissolve or affect the teeth. It is the organic acids, which are formed in the mouth

and presented to the tooth-tissue in a nascent condition, that work the mischief.

There is another important fact to be considered in this connection; a point that was raised by Dr. Bogue and partially answered by the chemist. When acids are taken into the system they are at once decomposed. If we absorb acids continually, all the fluids and secretions do not necessarily become acid. There is a disruption of the elements of the acid compound, and new combinations are formed under the dominion of physiological law, and these take the place of the former. Thus we may imagine the hydrogen, the oxygen, and the sulphur of sulphuric acid parting company and entering into new combinations which would be of a distinctly opposite nature, and thus an alkaline reaction be established. Indeed, I believe that one school of medicine bases at least a part of its practice upon the reactions of nature, and for an acid condition prescribes, not an alkaline, but an acid remedy, according to their law of "*similia similibus curantur*." I am not advocating homœopathy, but I believe that this one principle recognizes the fact, whether consciously or unconsciously, that nature works upon methods of its own, and that to give any inorganic material is to invite an activity which can have no result except to disrupt it, if a compound, and to select from it such elements as can be used in the forming of other compounds that may be assimilated. If the inorganic matter ingested be a simple substance, it usually is excreted in precisely the same form in which it was received.

The saliva is not, then, made acid by the drinking of acid drinks or the eating of acid foods, for those acids might be so decomposed in the body, so metamorphosed by the physiological action of the organs of the system, as completely to reverse that which we might naturally expect would be the case.

We do not readily comprehend that which takes place within the human organism, that peculiar process which we call nutrition, which works according to its own laws. The body does not take up inorganic matter for nutrient purposes, nor will it necessarily derive its acids from acid sources. The fluids are elaborated within the organism, and whether they be acid or alkaline depends upon that nutrient process, the assimilative condition, and not upon the character of the food ingested. In certain nutrient conditions the fluids of the body may have an acid reaction, even though the most scrupulous care be exercised to take none but alkaline foods and drinks, and possibly because of that selection. There is a metamorphosis within the body that is not governed by the nature of

that which is received from without, but which obeys behests that are subjective rather than those that are objective in their character.

Dr. S. E. Davenport.—I feel that we are under great obligations to Dr. Weld for his interesting and scientific paper, also for the experiments which he has performed so successfully before us, and I would move a vote of thanks to him for his efforts; also to Professor Elliott for giving us the fruit of his study in this direction.

Seconded and carried.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,
Editor New York Odontological Society.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular monthly meeting of the American Academy of Dental Science was held in the Boston Medical Library Association rooms on April 1, 1891, Vice-President Brackett in the chair.

The paper for the evening was read by William Barker, D.D.S. Subject, "A Discussion of the Fee Problem."

(For Dr. Barker's paper, see p. 533).

DISCUSSION.

Dr. Brackett.—Gentlemen, you have heard the paper of Professor Barker, showing plainly, what some of us have appreciated before, that he is a student of social problems. He is especially known in Rhode Island as a profound student of social and economic questions, and he has made this the basis of a special application which certainly has been most interesting and suggestive for us. The paper is open for discussion.

Dr. Fillebrown.—I was much interested in Dr. Barker's paper. I did not quite understand, however, how one point would be met. It could be stated thus: Persons who may be well known to us, and whom we may desire to help, come into our office having some trouble with the teeth; we cannot allow them to suffer pain,—something must be done for them, but they have no means to pay, and we know it. The operation is going to take as much time as if we were paid for it, but we cannot turn them out and let them suffer. For humanity's sake we are bound to do something to alleviate that pain, and we cannot do it unless somebody else pays for it. This is an extreme illustration, but I did not hear such a case touched upon in the paper, and would like to have it explained.

There is another point, but perhaps that is covered by the idea of cost. One man is naturally much more skilful than another,—he can do an operation very much quicker, easier, and the results are better than those of another man who has to give twice the time for the same work. In the case of the skilful man, on account of his natural quickness and intelligence, the total cost of time and materials might be represented by five dollars, while in the other case the cost of it might be represented by twenty dollars. Now, ought the one who has performed the same amount of service with less discomfort for the patient accept a sum which represents the cost in time to him?

I am heartily in sympathy with the working of the social problem and the bringing it into practical use, but one cannot go to extremes while the general average of the world is so far behind in the practice of the system. I would like to hear how socialists, through social glasses, view the question of the charitable work that we are called upon to do. It seems to me that all our hospitals, dispensaries, and so forth, are based upon the supposition that the rich are quite willing to pay the fees that shall enable each man to do his share towards helping those who are less favored.

Dr. Williams.—The matter of charging by time is of modern origin, and many dentists make it an absolute gauge for fees. It was established about the time of the war, when things began to boom generally. I have never brought myself to making that the main consideration, for several reasons. In the first place, I have always believed in the fact that Dr. Holmes once stated, that the most healthy man does not feel equally well at all times in his life. Therefore, if you try to give the same amount of effort every day, you do violence to your constitutional stock,—you have to draw on your principal, as it were. Bearing this fact in mind, I have made it a rule to work as I feel. I would not feel as the plumber or the locksmith, that I was obliged to do just so much work because I was paid for so much time, but I would do the thing well if it took me twice the time, and I would charge for what I did. In some cases I have charged about as much as the highest fee Dr. Barker mentions for about half an hour's work, and in other cases my charge was probably not more than the lowest fee. I calculate mainly on what is done for the patient, taking the matter of time as a secondary consideration. I should not, as an orist, charge like some other specialists. For instance, I have known of a case where an aurist charged ten dollars for painting the back of the ear with

iodine. It could not have taken much time,—I should think not as much as to take out a tooth, which I would charge a dollar for. It has never been my custom to make just so much every hour of my time, and I get along better mentally, physically, and, I think, more conscientiously than if I charged only by the time.

Dr. Fillebrown.—I made it a point not to antagonize the speaker in any way, but to draw forth a still further explanation of a part of the problem that bothers me. I should be glad to see the condition of society described in "Looking Backward" entirely realized here,—we could all of us live easier and better as far as our physical comforts are concerned, though we cannot tell what the effect would be on the moral and intellectual health. I heard of a case to-day that illustrates one phase of what I was alluding to. A gentleman told me of a friend of his who had had considerable dentistry done. At one time he was under the care of a dentist for more than a year for the treatment of a single tooth, and had been in trouble all the time. The patient then called on another dentist, and within two or three visits the tooth was cured,—made entirely healthy, and has remained in a healthy condition ever since. Now, if you are reckoning by the cost, the first fees were too large for the benefits which accrued; if estimated by the amount of good done, in the second case the fee was very small. There is the trouble in all these things. It seems to me that, under the present constitution of society, the principles laid down in the paper cannot be carried out. If we would all join hands at once, something might be done, still I don't see how we could overcome the question of natural aptitude. Under certain conditions one man might be entitled to ten dollars and another would only be entitled to ten cents. It was stated in the paper that corn, beef, and pork cost alike to each one. That is not true; we know perfectly well that the millionaire buys more delicate goods and pays more for his beef, canned goods, and all articles of food than he who is earning but two dollars a day. He pays more for his cooks, and has his food better served than persons of moderate means. He may even pay ten thousand dollars a year for a cook, where most pay but a few dollars a week. There are many things which go to increase the cost of his food, so that there is a difference in the cost of even the simple things that go on his table.

Dr. Allen.—There is a principle at stake here which every one should recognize. I feel that each one should know for himself what his time and his services are worth, and that we should seek to enlighten our patient in this regard. As a rule, we are apt to

gauge the value of our services by what we can get for the same. For instance, a young practitioner may not feel that his services would bring as much as one who has been in practice for twenty years, or longer. It seemed to me that the simplest way of getting at the point is for each one to determine for himself what he is willing to work for,—the sum that a day's labor ought to yield,—and having determined that point, let us gauge our fees accordingly. I am perfectly willing to work upon that basis. I believe that we can work with much more justice to ourselves and to our patients if we make a definite charge for the time the service occupies, the cost of the material used should not be specially considered (except in artificial dentures) as it is very trifling compared with the fees charged.

Regarding charitable work, if I give an hour's service I give it in the name of charity. I do not ask or expect any one else to pay for the bestowal of my charity. I will work the remainder of the day, and apply the net proceeds to myself.

Dr. Clapp.—One remark of Dr. Allen's has great force in this connection, and that is, that each man must, so to speak, be a law unto himself. I do not believe that there is a business, a specialty, or a profession, or any occupation in the world that requires so much uprightness and force of character to stand on the top plane of possibility as the dental profession, and there is no man living, outside of the operator himself, who can properly say what his fee should be. There is no other man that knows the circumstances, and when we come to gauge and to determine the fees for dental operations by any fixed law, or by any analogy of reasoning, I do not believe it is possible to equitably do it. Some time ago I went to a physician to pay a bill, and at the same time that I was in his office I was troubled with a slight affection of the throat. He is one of our foremost practitioners here in the city, and I asked him to look at my throat. I stepped into the light and opened my mouth. He looked into my throat and said, "Humph!" then turned and wrote a prescription, and handed it to me. The whole thing did not exceed one minute and a half, and his fee was three dollars. Now, I did not pay him for the time he occupied in looking into my throat and writing the paper,—I paid him for his twenty-five years' experience. And, to my mind, he gave me greater service in that minute and a half than many another man would after studying my case an hour. The matter depends largely upon one's own personal experience and one's own conscientious application to the question of fees as well as to means and methods of work.

Dr. Grant.—I do not know that I can add anything to what has already been said. I am very much interested in Dr. Barker's paper, and the thought occurred to me, which has already been so well stated by Dr. Allen and Dr. Clapp, that there cannot possibly be any other standard for fixing fees except the man's own judgment in the matter. He has of course many things to consider,—first, what his education has cost him; then the class of patients he can command, and also his years of active life. I do not know exactly how a man can fix the standard of his professional services, it depends a great deal upon his motive in entering the profession, whether to gain fortune, or simply for what is the ideal plan,—of doing the best he can for humanity and getting simple remuneration that shall give him comfortable life. Every laborer is worthy of his hire, but while many men put much time and comparatively small capital in cash into their profession, of course many others put both, and then there is the interest on time that he spends in perfecting himself and the interest on actual capital invested to be taken into consideration. Of course, the man who gives both time and money to his profession cannot afford to work on the same plane as the man who only gives his time. I think the principal element which is taken into consideration in adjusting fees is the class of patients that are attracted to a man either by his professional reputation or by his social standing. It seems impossible that there should be a general plane upon which all dental fees could be gauged, each one of us must do as our conscience and our foresight in the matter of temporal affairs shall dictate.

Dr. Williams.—Perhaps some of you may have heard of the curious way in which a dentist in one of the suburbs of Boston used to charge for his services. He charged according to the number of sheets of gold he put in a tooth, and, of course, the effect of it was for him to see how much gold he could pile on, and he used to make some very peculiar structures.

Dr. Brackett.—I do not think it is essential, because we perform a gratuitous operation for a patient who needs it, that we should charge for that operation some one who is more than able to pay. I think the remarks of Dr. Allen—"If it goes as charity it should really be charity"—are most commendable. In this particular, although we do a great deal for which we receive no compensation, it is little compared with what those of other professions, especially physicians, do; and it has been urged against our claims to professional standing that we have not done the amount of gratuitous

service that men of broad cultivation and higher plane might well do for the advantage of humanity and the world.

Dr. Smith.—It may be unfortunate, from a purely scientific point of view, that fees have anything to do with our work. If we were all born of wealth, and could practise our calling merely for the love of it, we would not have this question to contend with; but with things as they are, it is a matter largely of supply and demand, and the fee must be limited to that demand. For instance, if a practitioner finds his time taken from early morning until night, with others begging him to work on the Sabbath, he can with justice say to himself, "My fees shall be a little more than they have been. There is a demand for my services by people who have the money and are willing to pay for them." I have had people say to me, "Dr. So-and-so charges fifteen dollars an hour for his services, don't you think he is a robber?" I would say, "Not at all; I suppose he is now obliged to refuse appointments with people who would pay him twenty dollars an hour if he could accommodate them." I think our fees must be limited almost entirely by the demand upon our professional services.

It has been said that the dental schools, the hospitals, and the infirmaries take away, in a measure, the opportunity for young practitioners to gain an income from their practice, which is very true; but it must not be understood that we are opposed to the hospitals and infirmaries. They should be conducted, however, in such a manner as to cater only to the strictly charitable patients. The demonstrator, I think, should have the power to make a distinction between those who can afford to pay and those who cannot, and when a woman goes to a dental school wearing diamond earrings, seal-skin sack, and eight-button gloves, it is time she went to some office and paid a fee.

With regard to charity work, it is much harder for us to do this work and not suffer more for it than any other profession. A medical practitioner can see a number of patients in a short time, many of the cases being evident to him at a glance, and requiring but a minute and a half of his time, as the one cited here to-night. What can a dentist do in a minute and a half that is charity? If he fills a tooth, it takes time; if he treats a tooth, it takes time; and if he tries to do much of this work, he finds he has used up a large share of his time, and his time is his stock in trade. A lawyer can give his advice and do charity work and his income does not feel it, and there are other professions which do not suffer financially from the charity work which they see fit to give. Physicians

suffer largely from our hospitals and charitable institutions by the richer people taking advantage of them. I was told by a noted surgeon that wealthy patients will go to the hospital and take a private room and have the services of the best surgeons, and it costs them nothing for the surgeon's services, they merely pay the rent of their room, the surgeon being obliged to give his services because of the position he holds. I understand that it is becoming a common practice for rich people to go to hospitals where they have the services of the physician and nurse free; perhaps they think they are better treated. The physicians have a sliding scale of prices; for instance, the fee charged by a noted oculist for the removal of a cataract for a very rich patient was five hundred dollars; for a patient in moderate circumstances his charge would be two hundred and fifty dollars; for a person in less than moderate circumstances, one hundred dollars, and even less than that, so in that case the rich pay for the poor. To a certain extent I think that is just. The oculist may put himself on this ground: that his fee for the removal of a cataract is five hundred dollars; every dollar which he discounts from that is to that extent charity work.

There is another point of which I wish to speak, and that is, that a fee should be charged for everything we do, unless we make it a charity case and charge nothing. It is quite common among dentists to make an examination of the teeth, which, if properly done, takes fully half an hour, and yet it is a common practice to make no charge for it, in the expectation that the patient will have to pay for it later on. I say that is unprofessional. I say that every operation—and an examination, I hold, is one of the most important of operations—should be charged for.

In regard to whether we should base our charge upon the minimum or maximum basis of time,—I don't think either is correct; it depends entirely upon the patient. For instance, if I am performing an operation for a very nervous patient, and it takes me two hours to do what I might do for another in an hour's time, I hold that patient should pay me just twice as much. I sympathize with the lady on account of her peculiarly nervous temperament and know that she is not to blame for it, yet I cannot afford to suffer financially for her misfortune.

Dr. Barker.—Of course, Mr. President, for me to say anything is only to say in a different way that which I have already said in the paper. But before I attempt to go over the ground which I attempted to cover in the paper, I want to say one word with reference to myself. There seems to be an idea prevalent that I

am a socialist. I am not a socialist, nor am I a nationalist, probably no more so than most or any of you here. I simply believe in justice. I believe that one of the first principles which should govern any person after they have arrived at adult age is the principle that they are bound to take care of themselves. God gave us all a stomach which needs supplies of food, and with the stomach he gave us two hands to supply the needs of the stomach, and absolutely no one but ourselves ought to be expected to or be called upon to supply those needs, provided we have health and strength. And let me say incidentally that if conditions were as they should be, there would be an opportunity, at least, for every one to employ the hands for the satisfaction of the needs of the stomach, and we should not find a large class in this community—as we find in every community—not only supplying their own needs, but supplying the needs of a large class of drones, which we may liken to barnacles on a ship, aiding in no way its passage over the waves, but rather retarding its progress. Of course, this question resolves itself at bottom into a great moral question. Now, if you admit that when a man arrives at adult age he is bound to take care of himself, that he may not rightfully call upon anybody else to take care of him,—if then he is bound to supply his own needs, and may not rightfully be called upon to supply any but his own needs, will some one please tell me how we can fix on anything but cost as the limit of price which he is to give to his neighbor in exchange for something which the neighbor gives him. I admit that it is difficult to determine the absolute ideal in any given case, but let us suppose that it has cost me in time, effort, material, and repugnance to overcome something which Mr. Smith wants more than he wants the coat on his back. He has an extra coat, which he thinks will do him just as well. I like that coat, and a barter is arranged between Mr. Smith and myself. Suppose we make an exchange. If I am to get in that exchange a coat which cost him more than twenty, why I have been getting something for nothing, and manifestly, I have been making Smith contribute to my support, whereas I ought to support myself. We become perplexed in thinking over this question, simply because, under present conditions,—and these same conditions have existed for many centuries and are likely to exist for some time to come,—this principle has not been recognized. We all of us say if we get a hungry man who will pay us a good price, we will take it from him, and we practise it too. In spite of the illustration offered to-night to prove that the rich man pays more for his needs than the poor

man, it is not a fact. The grocery where I trade is patronized by men of all classes, and the wealthy men do not pay a penny more for the sugar, the flour, or the beef they use than any of the others. And they ought not to. What right has the grocer, the dentist, or the doctor to say what the ability of the purchaser is? What right have I to say to the seeker of my services that he shall pay a fee proportionate to his ability to pay? It is none of my business, gentlemen, what the ability of the purchaser is, it is none of your business. You may estimate the cost of your services, and the would-be purchaser, if he is a wise man, will place his own estimate upon their value to him, and if the cost seems to him to be greater than the value, he will not purchase. And now, because we have a class in every community who have amassed colossal fortunes, and are rich beyond the dreams of avarice, because they have ignored this cost principle, and they fall into your hands, you say you will recover your loss by getting all you can from them. Because he has been a great bandit, you will be a lesser bandit, and think it is all right to take from him a part of that which he has taken from others. The ideal thing is for every man to take care of himself, to live upon the rewards of his own industry, keeping his hands entirely off of that which his own industry did not produce. But, some one will say, am I to starve? And, as I said in my paper, a man who should undertake to do business upon ideally equitable terms where no obligation to reciprocity was recognized manifestly would have to go to the wall, and when you come to look at this question closely it resolves itself down to this: How far may I violate a correct principle in order to maintain my life? As I told you in my paper, conservation of energies is essential. Believing that I have no right to take from a patient in fee one penny more than the service has cost me, I may rightfully, however, include in the reckoning the cost of material and time expended directly in it, and a proportionate part of the time, thought, and study expended in my preparatory student days, and something for repugnance overcome, until finally, as I said before, it comes down to a question of casuistry,—How far am I willing to conform to a principle which seems correct? One of the great troubles comes in the belief or conception which most people have, that they ought, during the years of their active life to accumulate wealth enough to erect a barrier between themselves and that contingency, which none of us like to contemplate, namely, the poor-house, and so they say, if I can find a rich man here and another one there, I will plunder them by the ordinary means, and I will

use my plunder to erect this wall or barrier. My object in this paper is simply to point out a principle, leaving each man himself to be the judge as to how he shall apply it in his own practice. We sometimes hear that a certain dentist gets twenty dollars an hour for his services. Did you ever really think what it meant? The majority of people, right here in the city of Boston, working for a living, cannot command on an average more than two dollars a day for their labor, and yet some dentist, because he has spent some time and money in educating himself, thinks he has a right to appropriate in one hour what that man would earn in ten days. I simply say that such a fee as that violates the reasonable correspondence between cost and price. I do not undertake to say just where the line lies, no man can say that. I have an item in my note-book, clipped from a paper, which says that a dentist in New York took five hundred dollars in one fee for a service which occupied but ten hours of his time. What items of cost were there included to make his services worth fifty dollars an hour? I thought at the time I first saw it that it was infernal robbery, and I think so still, and I believe that any man who is willing to support himself and wants to come honestly by everything that he gets cannot charge any such fees.

Some half a dozen of you have summed it up, now let me sum it up. You seem to think when you are disposing of your services to men of varying means, some of them millionnaires and some of them poor men, that you have a right to take what they can afford to or can be made to give you. Let us place ourselves in the position of the buyer who needs our services, and who says, rather than go without them, he will pay five hundred dollars, and we can perhaps better see the injustice of making one's ability to pay, or the value of the service, a measure of its price. Our steam- and horse-railroads, our theatres and our merchants, from an A. T. Stewart to the peanut-vender under the shadow of his war-horse, have the same price for a like service to rich and poor alike, and there is no principle which can govern any other course. To get what you can is not principle. It is something suggestive of cannibalism.

In disposing of our services let us ask, What has it cost me? and keep out of sight, so far as possible, the question, How much can he afford to pay, or be made to pay? Self-preservation and the continuance of civilized institutions will sooner or later force society to adopt some such principle as we have presented. In the mean time let each man hew as near the line as, under all the circumstances of his environment, he can, and all the sooner shall the

drones be driven from the hive, all the sooner shall labor and industry have its full reward, and idleness and inefficiency likewise receive their rewards, and so civilization will be perfected.

Subject passed.

Dr. Fillebrown.—I have here a record of twenty-two consecutive cases in which I have used the dental thermo-obtunder. If there are any members here who have not seen this instrument, I will say that it is a little cylinder which holds a small cartridge. The cartridge contains a wick which is saturated with alcohol. Beyond the cartridge is a copper bulb which is heated, and beyond that is a tube which carries a small spray of alcohol vapor into the tooth. The temperature conveyed by the alcohol vapor is about 110° F., and it usually takes about sixty seconds to obtund the tooth.

Eighteen of my cases the patients pronounced completely successful. Four cases were only partially successful, but the operations were made more endurable by the use of the obtunder. Of the four cases, two were much benefited, but suffered considerably in the application of the remedy. One case suffered much in the application, though it was made gradually, and seemed to get no benefit at all.

Dr. Andrews.—I have had one of these appliances for a week, and have had no occasion to use it.

Dr. Ainsworth.—It is remarkable, when a person has the instrument, how seldom he will require to use it.

Dr. Allen.—I suppose many of you know I have used that instrument almost from its first inception. Mr. Small brought a very crude form of it to me shortly after he brought it to the notice of the profession, and I used it with excellent results. He subsequently furnished me with a smaller instrument, which does the work equally well and can be more easily handled. I do not have occasion to use it every day, but I have been very successful with it, and I have yet to see the first case where permanent injury has been done by it.

Dr. Fillebrown.—Sometimes, it seems, the presence of an instrument prevents the need of it, but we also find that there are many times when we can use it effectively. I did not say that these cases came right along consecutively, or that I need it in every operation, but I have taken the cases as they occurred, omitting none, and brought them all together. So far as I have gotten in the matter, it seems to be a very desirable thing to have. The success of this, as other instruments, depends upon the faith and

skill with which an operator uses it, and the determination he may have to thoroughly understand it.

Dr. Ainsworth.—Perhaps I have not put myself clearly before the society in this matter. I believe in the instrument and believe it will accomplish a great deal. I have for a long time, as many of the rest of you probably have, used alcohol in various ways, both hot and cold, but this instrument seems very much superior to anything that I have seen or thought of. I consider it a valuable acquisition.

Dr. Barker.—Our President, Dr. Seabury, requested me to bring some aluminum foil to the Academy this evening, and such of you as wish can take some of it and experiment with it. It has been recommended as a filling-material, but he says that he thinks this particular make is too fine for practical purposes, but perhaps a little heavier make than this might be used with advantage.

WILLIAM H. POTTER, D.M.D.,

Editor American Academy of Dental Science.

AMERICAN MEDICAL ASSOCIATION.

Tuesday, May 5, 1891.—Morning Session.

SECTION OF ORAL AND DENTAL SURGERY.

THE section was called to order on Tuesday, May 5, by Dr. E. S. Talbot, of Chicago, Ill., the chairman of the section. Dr. Custer was elected secretary *pro tem*.

Dr. Talbot.—It may seem to some of those who are in attendance that the number is rather small; but having been present at all the meetings since the section was organized, ten years ago, with one exception, I can say that it never was intended that there should be a large number at these meetings. It was understood that those who were invited to read papers should be men of unusual scientific abilities; and that the papers should have their effect upon the medical profession by being published. For this reason the society has never catered to a large gathering; but there are quite a number of dentists in the city, and to-morrow we may expect to have a larger meeting. There are no minutes; the section simply keeps a record of the papers that are read at the meeting, and the minutes are not intended to be reported at all.

We will therefore dispense with that matter, and the first order this afternoon will be the chairman's address. I will call Dr. J. L. Williams, of Boston, to the chair.

Dr. Talbot then read his address as president of the section.

(For Dr. Talbot's paper, see page 510.)

There being no remarks upon the address, it was passed.

Dr. Talbot.—The next paper upon the programme is by Dr. William Carr. In order to facilitate the reading of papers it has been decided to set apart to-morrow afternoon, from three to half passed five, for the purpose of hearing papers by Dr. George S. Allan, of New York, and Dr. R. R. Andrews, of Cambridge; and we have a paper by Dr. A. H. Thompson, of Topeka, Kan. Dr. Thompson was unable to be present.

A discussion then followed in regard to the propriety of appointing a committee to examine papers. They were finally referred to the appropriate committee.

Dr. Noble.—I would like to remark that Dr. Edward Maynard died last evening, and I feel it would be highly proper for you to take, at this very first meeting, some steps in reference to his death, and that proper resolutions should be drafted, and that a delegation be appointed to attend his funeral.

Dr. Andrews.—I did not know he was so near death, and think the suggestion a good one.

Dr. Noble.—I presume the announcement of his death will be in the evening papers. At the last meeting of the section in Washington I know there were quite a number who took a great deal of pleasure in visiting Dr. Maynard, and I think he came to one of the meetings. He certainly was a man deserving of respect and appreciation. I hope that some action will be taken.

Dr. Williams.—I move that a committee of three be appointed to draft suitable resolutions on the death of Dr. Maynard, and that as many of the members of the section as possible attend his funeral.

Motion seconded and passed unanimously.

Dr. Allan.—I would like to include Dr. W. H. Atkinson with Dr. Maynard in those resolutions.

Motion seconded and passed.

Dr. Noble.—I wish to say that our old friend, Dr. Maynard, came to this city about thirty-five years ago. I came here as a young man and as a student, and I well remember at that time with what veneration we looked up to Dr. Maynard, who was then in the very height and pride of his national reputation. I wish to bear

personal testimony to his wonderful skill with his fingers; his manipulative ability, not only in the matter of filling teeth, but his knack in the way of making and using tools and instruments in the laboratory. He was one of the most wonderful men I ever knew with reference to executing what his brain thought out; and we all know what a large-brained man he was, and that for many years he was looked upon as one of the leaders in our profession in all the things that pertain to advancement in the way of mechanical appliances. He was one of the first to thoroughly remove the tooth pulp, and probably with more thoroughness than was done before or for some years afterwards. This was mainly due to the care which he took in preparing the fine nerve-broaches which we are now familiar with. I also feel proud of having his name on my diploma along with that of Drs. Harris and Bond. I think there is only one man now living whose name is on that diploma, and that is Professor Sterner. I feel deep sorrow to hear of the death of Dr. Maynard. Of latter years you have not heard very much of him, and I am sorry to see there has been some language used with reference to him that seems to me uncalled for; that he has not taken an active part in societies, his age preventing. I hope we will always be ready to say, peace to the ashes of Dr. Maynard; for he certainly was deserving of veneration; as an operator he stood pre-eminent in our profession. He was always dignified, and, as we all know, bound up with its best interests.

Dr. Talbot.—I will appoint on that committee Dr. Noble, Dr. Allan, and Dr. Williams.

The next paper in order will be that written by Dr. A. H. Thompson, of Topeka, Kan., on "The Teeth of Invertebrate Animals." It will be read by Dr. Marshall.

(For Dr. Thompson's paper, see page 519.)

Dr. Talbot.—You have all heard Dr. Thompson's paper read by Dr. Marshall. Are there any remarks?

Dr. Whitfield.—There is very little I could say on the subject. Last summer I was very much interested in the study, and I have some teeth at home which I think are nearly three-eighths of an inch long and the arrangement is very beautiful. There is a little skeleton-like arrangement, something like a trap, coming to a point, and the tooth presses down over that point. They all work separately.

Dr. Rusk.—A few days ago I saw a specimen which I would like to show here, and will bring here some time during the ses-

sion. It is a very large tooth that was sent by some chief in the West, and the remarkable part of it is that the enamel is black, or almost black. It is a very immense tooth with very short roots. I think it is a very rare specimen.

Dr. Talbot.—As the sessions are to be very short and we have to leave the room at half-past five, and as there are a large number of papers, it would seem to be a good plan to have another one this afternoon, so as not to crowd them in the last session; and I would suggest that Dr. Marshall read his paper.

At the suggestion of Dr. Andrews the reading of Dr. Marshall's paper was postponed to a future meeting.

On motion of Dr. Marshall a committee of three was appointed to nominate officers.

Dr. Talbot.—I appoint Dr. Marshall, Dr. Taft, and Dr. Williams.
Adjourned.

Wednesday, May 6, 1891.—Morning Session.

The meeting having come to order, Dr. Talbot occupied the chair.

Dr. Talbot.—The first order of business this afternoon will be the election of officers. According to the constitution and by-laws, officers are to be elected the second day of each annual meeting. A committee was appointed to attend to the matter, and as this is the time for that order we shall take it up at this hour. Have the nominating committee any report to make?

Dr. Marshall.—Mr. President, the committee have not been able to get together yet, but we will make a report after the discussion closes.

Dr. Talbot.—If there are no other committees ready to report, the next order of business will be papers from Dr. George S. Allan and Dr. R. Andrews.

(For Dr. Allan's paper, see page 525.)

Dr. Taft.—Mr. Chairman, the paper that I have just heard seems to me a very good one. It contains points that ought to be regarded and utilized in the treatment or management of the borders of cavities, and especially proximate cavities, which is one of the most important particulars in the matter of filling. It strikes me that in all instances the operator should be guided by the kind of material or tissue he is working upon, or rather the character of the tissue or material. Some teeth are of such good structure that treatment for the arrest of decay is more easy and simple than in others. The importance of thoroughly studying the char-

acter of the tissue upon which the dentist expends most of his operative skill should always be kept in mind, whether strong, firm teeth or those of poor, soft structure. It requires very delicate manipulation to secure the best results. I think this is one of the most important points, and a point that is much overlooked by many operators.

Another point that was emphasized, and justly so, was the perfection of finish which ought to be put on the border of every such cavity. It should be polished or dressed with diamond-dust or anything else that will make a perfect finish. Another point is the overlapping of gold. We all know there is a great deal of faulty work done in this direction; a great deal of gold overlapping that ought to be cut away. I think that there should be no more overlapping than there has been cutting of the enamel or dentine. In no instance should gold be permitted to overlap the normal or uncut surface of the teeth.

Another point is the uniform condensation of gold in the cavity. Now, we may say that it is not of great importance, but it is, for if the gold is imperfectly consolidated there is always room for mischief. It should be a matter of study, then, to secure the most uniform condensation, the most perfect adaptation, the most uniform condensation of the gold throughout the cavity. Great skill is required and delicate and intelligent manipulations to secure good results. As to the subject of welding, skilful manipulation is required; the material used must be in good condition; if gold, it must be properly annealed. Any mistake in annealing is fatal. The gold must be free from foreign substance, and it should be pure, and it must be condensed with proper instruments. I believe that nine-tenths of the instruments used are not as they should be. Those only who have manipulated a great deal can tell you how to do it; that is only attained by experience. It is a process that is difficult to definitely explain. The most direct pressure that can be made on the surface is best; if an oblique blow be given, you will very likely destroy the surface for receiving the gold; the best results are attained by as direct pressure as possible. The paper is full of good suggestions.

Dr. Talbot.—Any further remarks? *Dr. Allan* will close the discussion.

Dr. Allan.—I wish there were a little more discussion on this subject. I always like putting in contour fillings. I think there is as much conscience required as skill, and no man can do good work unless he puts his conscience into it. I am very glad to have

my old friend Dr. Taft so kindly bring forward so many of the points in my paper, and I appreciate it. I will only draw attention now to one point to see if I cannot bring out some more discussion about it; because it is a matter about which I have thought a great deal and I hope with good result to myself. It refers to the face of the teeth. The question I want discussed—and I have not seen any writing about it to any extent—is this question of whether gold ought to be built up overlapping the cavity, or rather the gold shall bulge over the cavity and be finished off. I take the position and believe that it is one that is substantiated, both in practice and in theory, that the building up of the gold overlapping filling simply lying against the face of the tooth is a greater error. Gold in a plastic condition, if over-hammered, becomes springy and does not take position against the face of the cavity that you can claim with certainty as being a perfect joint. In contour filling you hammer it against the side of the cavity, there is unequal pressure brought in condensing it in place, and the gold loses its soft character and becomes springy; and the more you hammer it the more the springy qualities of the gold are brought out, and it will work away from the side of the cavity and not lie uniformly and flatly against it. That point is one I would like very much to hear some discussion about, as to the advisability of allowing the gold to overlap the edges of the cavity to any extent, and if any, to what extent. I thank you very much for your kindness in hearing my paper and for the favorable reception of it.

(To be continued.)

Editorial.

ORIGINAL IDEAS—INLAYS.

THE value of having a place of record for new ideas was dwelt upon in a previous article, and the importance of this increases with every added month's experience. Ideas apparently of little value at the time of introduction have grown to serious proportions, and some of positive worth have drifted, by the influence of opposing interests, into oblivion.

It is within the cognizance of all that the apparently trivial operation of placing a band on a tooth has led up to crowns and from crowns to bridge-work with all that this implies. Had those who made this work in the experimental stages kept models and placed them on record, the litigation, so familiar, would have been impossible.

The younger generation of dentists have but little conception of the struggle waged by the profession against the encroachments of the company that manipulated the "rubber base," and of the years of annoyance, loss, and positive suffering that this occasioned. Had care been taken at the beginning, patenting would probably have been impossible, or at least valueless. It is the knowledge that carelessness reigns supreme in the dental profession in these vital matters which gives the unscrupulous the power and the audacity to patent improvements already in use. They trust to this want of care, and the trust has been often demonstrated not to have been misplaced, that when the case is tried in the courts there will be no evidence to invalidate the patent.

It is not necessary to multiply evidence in this direction, for the profession has experienced to its great sorrow the depths to which some men can descend in moral dregs, and at the same time how utterly valueless have been the efforts put forth on their part to combat it.

The present organization of the profession promises better results, but only in the direction of close attention to original data, upon which the superstructure of the future must be built.

Our attention has been again called to this matter by reading the discussion recently held upon "The Report of the Committee on Dental Art and Invention," W. B. Ames, D.D.S., chairman, and read

before the Illinois State Dental Society (*Dental Review*, June 15, 1891). The remarks drifted to an examination of various kinds of inlays, and, as a whole, was of unusual interest. The point, however, that seemed to impress the writer was a lack of information in regard to the origin of certain forms.

It would be difficult to go back to the period when this operation was first introduced as a means to overcome the disfigurement of a filling on labial surfaces, nor is it important, as it does not affect materially the question at issue.

The impetus given to this subject in this country has been largely due to Dr. W. Storer Howe's efforts to improve the older process, and has had much to do with leading the inventive mind, both here and in Germany, to the adoption of various means to render this of far more value than could have been anticipated even a decade in the past.

In the discussion alluded to, glass inlays were particularly dwelt upon, and the various modes best adapted for taking an impression of the cavity were described at length, as also the material of which to form the inlay, gold, porcelain, and glass each having adherents.

The preparation of the matrix in which to form the inlay called for special attention. That made from gold-foil was preferred where gold or glass inlays were to be used.

It is at this point that we feel that special regard should be had to the origin of the process, as it may contain the germ of something of great value in the future.

At the session of the American Dental Association, held at Excelsior Springs, Mo., 1890, Dr. James A. Swasey described his process as follows:

"The inlay that I use in all large cavities . . . I make from gold. My method is to cut a piece of proper size from a ribbon of gold rolled to about one hundred to one hundred and twenty, and then to anneal it. A piece of cork or erasing rubber is then cut to fit into the cavity. The piece of annealed gold is then placed over the cavity, being held with the pliers in the left hand, while the gold is burnished with a large burnisher into the cavity. The cork or erasing rubber is then put in place and held there, and the edges are then burnished down. The overlapping gold should then be trimmed off, the whole annealed again, and placed in the cavity with rubber or cork in the inside. The mouth should then be closed, when the pressure of the rubber will make an adjustment of the gold on the margin of the cavity. The inlay should then

be carefully removed and invested. Twenty-carat gold should then be cut into strips and placed in the shell and melted there."

This is sufficient to show that Dr. Swasey claimed originality in the form and process of making the matrix.

In the November (1890) number of the INTERNATIONAL DENTAL JOURNAL is an article by James A. Bruce, D.D.S., of Melbourne, Australia, in which he describes Dr. Herbst's method, a knowledge of which he acquired by personal observation. The plan of Dr. Herbst will be found practically the same as that already given by Dr. Swasey. After describing the preparation of the cavity without undercuts, he says, "Next line the cavity with one layer of No. 60 gold-foil, pressing it into place with india-rubber or some such material, and finally taking a wax impression (the wax being used hard), the gold being withdrawn in the wax. The result is a sharp impression of the cavity, into which plaster and pumice in proportion of two to one, respectively, is run. After this is thoroughly set, boil out the wax, leaving your model with the gold coating." Into this matrix glass is melted, the gold remaining "giving a sharper edge to the glass filling" (inlay).

Again, in the JOURNAL for March, 1891, Dr. John Girdwood, Edinburgh, enlarges upon this same topic, after giving Drs. Herbst and Richter the credit of the earlier work in glass inlays and the preparation of the matrix of gold, as described, and then gives some original ideas in regard to the melting of glass.

At the Illinois State Dental Society meeting, already alluded to, Dr. Harlan quotes from an article by Mr. Henri Weiss, published regularly in *Ash's Quarterly Circular*, but credit is given here to *The Journal of the British Dental Association*, of April 15, 1891. This is identically the same as the Herbst process and differs in no essential particular from the Swasey mode. Dr. Harlan was evidently misled into regarding the Weiss process as an original one, which from present information it does not seem to be.

The object of this examination is not to determine priority of discovery, but to place facts on record, leaving to others to determine the origin. It seems to us to lie between Drs. Herbst, Richter, and Swasey, but sufficient data are not at hand to determine the matter.

The merit or demerit of the process is not now in question; but it seems as though a new field in practice had been opened, the extent of which it is impossible to realize, and it therefore becomes our duty to guard well the beginnings, that a patent in the future may be made an impossibility.

JOINT UNION MEETING OF THE NEW JERSEY AND PENNSYLVANIA STATE DENTAL SOCIETIES.

THE meeting of these Societies at Asbury Park, N. J., July, 15-17, was a most successful gathering. The number in attendance was very large, many from distant sections being doubtless attracted by the place of meeting as well as by the excellent programme arranged by the joint committee.

Several valuable papers were read, but the recasting of old ideas was noticeably prominent here as elsewhere. A serious drawback was the reading of papers by proxy. Writers of essays should endeavor to be present and read their productions, for no matter how well they may be presented, and these were exceedingly well done, the life of the paper is measurably destroyed by the process.

The plan of conducting meetings, originating in England, of having one or more to lead in the discussion of a paper, was adopted here, and in great measure destroyed that spontaneity of discussion so valuable in all such gatherings.

The New Jersey Society accepted an invitation from the Pennsylvania State Dental Society to meet with them in joint convention next year. No place was selected, but it was anticipated that the meeting would be held at Cresson, Pa.

Obituary.

RESOLUTIONS ON THE DEATH OF DR. JAMES W. WHITE.

At a meeting of the First District Dental Society of the State of New York, held June 9, 1891, the following resolutions were unanimously adopted :

WHEREAS, The First District Dental Society of the State of New York has learned, with feelings of deep regret, of the death of Dr. James W. White, of Philadelphia, an eminent and learned member of the dental profession,

Resolved, That in the death of Dr. White we recognize the fact that we have lost one who, by his labors in dental journalism and literature, has contributed largely to the advancement and elevation of dentistry as a profession.

Resolved, That as an evidence of respect to the late Dr. James W. White, and of appreciation of his valuable services to our profession, these resolutions be entered upon the records of the Society, a copy be sent to his family and to the dental journals for publication.

B. C. NASH,
Secretary.

AMERICAN ACADEMY OF DENTAL SCIENCE—RESOLUTIONS OF RESPECT.

At the monthly meeting of the American Academy of Dental Science, held in Boston, June 3, 1891, the Corresponding Secretary announced the death of Edward Maynard, A.M., M.D., D.D.S., of Washington, D. C.; James W. White, A.M., M.D., D.D.S., of Philadelphia, Pa.; and William H. Atkinson, A.M., M.D., D.D.S., of New York.

Resolutions of respect to their memory were unanimously adopted, deploring their departure, and expressive of their high character and great professional and private worth, and of their long and earnest efforts and labors in behalf of dentistry and dental education as writers, teachers, and practitioners, who have contributed so largely to make the profession worthy of its present advanced position, and tendering the sympathy of the Academy to their widows and families in their bereavement and sorrow.

These resolutions were ordered to be placed *in memoriam* upon the records of the Academy, and copies sent to the families of the deceased.

C. E. HAWLEY, D.D.S.

DIED, in Shreveport, La., June 9, 1891, suddenly, of paralysis of the heart, C. E. Hawley, D.D.S., in the fifty-first year of his age.

Dr. Hawley was born in Ithaca, N. Y., February 28, 1840. He was the son of the late Dr. Joel E. Hawley, a prominent physician of that place for many years. He went South when twenty-one years of age, and studied dentistry with the late Dr. Russell, of Nashville, Tenn. He then removed to Natchitoches, La., to practise, and there married a Miss Boultt. He subsequently settled in Shreveport, La., where he practised very successfully many years, and up to the time of his death. He graduated from the Dental College at Nashville, Tenn., in 1881, and was a member of the

Louisiana State Dental Society. Dr. Hawley was a brother of S. S. Hawley, D.D.S., now practising in Newark, N. J. He leaves a widow and six children.

Current News.

MEETING OF COMMITTEES ON DENTAL PATENTS.

THERE will be a meeting held at the Town Hall, Saratoga, Monday evening, August 3, at eight o'clock, of all the committees appointed by the different dental societies all over the United States, for the purpose of organizing and taking some action towards the prevention of the further issuing of patents upon operations in the mouth. It is hoped that every society will see to it that they are represented at this meeting. Remember it will be held the Monday evening preceding the meeting of the American Dental Association.

S. C. G. WATKINS, *Chairman*,

W. L. FISH, *Secretary*,

Of New Jersey Committee.

HARVARD DENTAL ALUMNI ASSOCIATION.

THE Twentieth Annual Meeting and Banquet of the Harvard Dental Alumni Association was held at the "Thorndike," Boston, June 23, 1891.

The meeting was the largest and most interesting ever held, about eighty of the Alumni being present.

CHARLES H. TAFT,

Secretary.

[The Constitution of the Harvard Dental Alumni Association was forwarded with the above. We regret not having room for it.—ED.]

ACCEPTED A PROFESSORSHIP.—W. C. Barrett, M.D., D.D.S., of Buffalo, N. Y., formerly editor of the *Independent Practitioner*, has accepted the professorship of dental anatomy and pathology in the Chicago College of Dental Surgery. He will enter upon his duties at the fall term, which begins in September. Dr. Barrett is one of the most distinguished members of his profession in the East. —*Western Paper.*

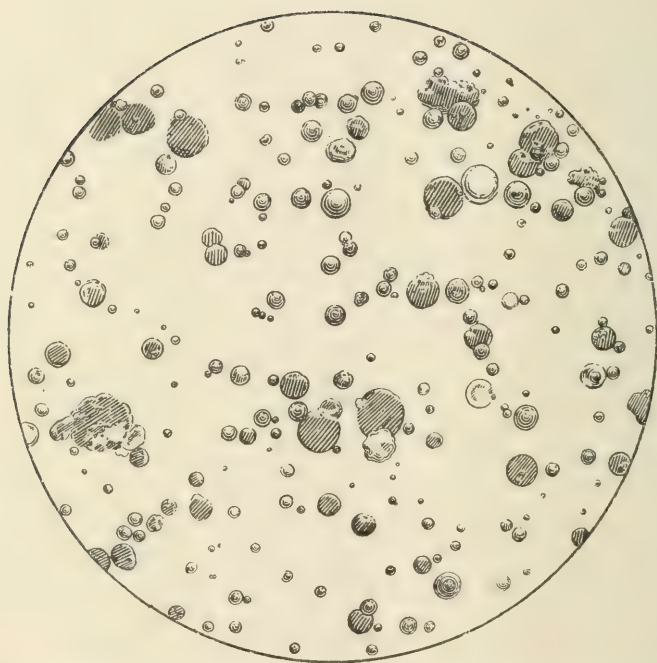


FIG. 1.—Showing the appearance of a plate of Agar-Agar which had been exposed for an hour in a current of air from the street.

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Original Communications.¹

THE BACTERIA OF THE AIR AS A DISTURBING FACTOR IN DENTAL AND SURGICAL OPERATIONS.²

BY W. D. MILLER, M.D., D.D.S., BERLIN, GERMANY.

THE fact that we are surrounded by microscopic organisms always present in the air, water, food, etc., was first definitely established by Ehrenberg in his "Infusionsthierchen als vollkommene Organismen" in 1838, although Leuwenhock had found micro-organisms in the saliva one hundred and fifty years before; and even many centuries earlier, in fact in the first century before Christ, a vague sort of an idea existed that infectious diseases were brought about by an invisible living something, which could be communicated from one person to another through the medium of the air.

At various times and places most fantastic ideas have existed regarding the nature of this agent, and, particularly in the seventeenth century, we are told, at the approach of an epidemic, the inhabitants of the villages assembled *en masse* with kettles, drums, etc., and set up a most fearful din to frighten away the carriers of the disease.

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the American Dental Society of Europe, at Heidelberg, August, 1891.

We need not, however, go back to the seventeenth century to meet with notions which disclose just about as great a misconception of the character of the agent under consideration as the prophylactic measures just referred to.

In order to form a proper conception of the distribution, number, and significance of the air-germs it is necessary to acquaint ourselves with their origin, or, in other words, with the manner in which their supply is kept up.

As micro-organisms cannot reproduce themselves in dry air, and for the most part soon die from want of nourishment or moisture, it follows that their number must constantly be recruited to keep up the approximate uniformity observed in the air of any particular locality. It has furthermore been shown by Nägeli and others that bacteria cannot be taken up into the air from liquids undergoing putrefaction or from moist objects, except where the liquid is in a very fine state of division, as foam or spray, in which case it, and of course the bacteria which it contains, may be carried for a short distance by the wind. This source of air-bacteria is of such minor importance that it may practically be left altogether out of account.

Accordingly the chief, and in fact only, source from which the bacteria of the air are recruited is the dried and pulverized organic matter which is caught up and carried from one place to another by the wind in the form of dust.¹

The air-bacteria are consequently almost invariably found clinging to particles of dust, since any substratum will very rarely be reduced to such a fine state of division as to completely isolate the bacteria which it may contain. It has also been found, as we should naturally expect, that the larger particles of dust carry more bacteria than the smaller ones. The number clinging to each particle will also naturally depend upon the number in the original substratum and upon the resistance which these germs offer to the drying process. Living cholera bacilli, for example, we would not expect to find, because they are killed by drying. In fact many species of bacteria are devitalized by drying, and the majority of all bacteria can withstand the drying process for but a limited time. So that the only means at the disposition of bacteria of finding entrance to the air—*i.e.*, drying—proves to be their greatest enemy, and tends to restrict their numbers.

¹ The spores of moulds are not included in this or the following remarks, since we are treating of bacteria only.

The actual number of bacteria in a given quantity of air at any one time will accordingly depend upon the amount of dust in the air and upon the number and kind of bacteria in the substrata from which the dust was formed. As the dust gradually settles in a quiet atmosphere, it follows that the air of a room which has been unoccupied for a few hours will be free from dust and consequently free from germs.

It will be readily seen that the idea conveyed by a quotation in the January number of the *INTERNATIONAL DENTAL JOURNAL*, page 73, that bacteria exist in the air in swarms something like gnats is entirely erroneous. It may happen that one particle of dust carries one bacterium, and another two or more, but anything like a grouping of dust particles does not occur. Culture plates exposed to the air a sufficient length of time for a number of germs to fall upon them will show a fairly equal distribution of the colonies, as may be seen in Fig. 1.

It was not possible to obtain anything like a definite idea of the number and character of the air-bacteria until the present methods of bacteriological research were introduced, and these have shown that the significance of air-bacteria has been very much overrated, and that the danger of infection by them is not as great as popular notions would lead us to believe. If such were the case, our wonderful modern methods of bacteriological research would be almost useless.

In making a culture on a plate of gelatine or agar-agar, we first take a glass plate from its case and carry it through the air to the levelling apparatus. It is then immediately covered up, but must be exposed again when we pour the gelatine, and a third time when we inoculate the plate, after which it is taken up and carried through the air to the moist chamber. All this may be done, exposing a surface many thousand times as large as that exposed in the opening of a tooth without a single extraneous germ subsequently appearing on the plate.

Again, it has been established that pathogenic bacteria in particular are seldom found in the air, a fact which has been generally recognized by surgeons and has modified surgical methods to a considerable extent.

But a few years ago it was thought indispensable to the success of extensive surgical operations that a spray of carbolic acid or sublimate should be kept going constantly during the operation to prevent an infection by chance air-germs. This practice has now been abandoned, because it has been found that the danger

of infection by air-germs is practically null compared with that of infection by unclean hands and instruments.

There is one operation in dental surgery in particular, in which bacteria are supposed to play a most important and disastrous rôle. It is a fact which we were all taught as students, a fact which those of us who are teachers have in turn taught our students, and a fact which we all have learned by sad experience,—that a tooth with a dead pulp, which may never have given any trouble whatever, will develop a severe pericementitis a few hours after the conscientious operator has bored into it and removed the pulp.

This result has been explained on the supposition that germs from the air obtain entrance to the root-canal during the operation, or, as some fancifully put it, are carried into the canal by the air rushing in to fill the vacuum. This being a question of fundamental importance, let us examine it from a purely scientific stand-point and see where we are led to.

In the first place we must do away with the idea that the air "rushes in" when we bore into the pulp-chamber of a tooth containing a putrid pulp; this could not happen unless a partial vacuum existed in the pulp-chamber at the time of operation. But a partial vacuum in the pulp-chamber or root-canal of a tooth with an open apical foramen is an impossibility.

On the contrary, the air, or gas, very frequently rushes out. During the subsequent operation of cleansing the root, however, we grant the possibility of minute quantities of air being introduced. I think I make a very liberal estimate when I grant that ten cubic millimetres of air may be thus carried into the pulp-canal. To be quite sure that we do not underestimate, let us say one hundred cubic millimetres. Again, if we assume that the air of a properly-kept dental office contains four times as many germs as the air of the streets of a large city,—*i.e.*, one germ per litre of air,—I think we are making a liberal estimate. If any one claims that his room contains a larger number of bacteria, we must advise him to keep it in better order.

Now, if one litre of air,—*i.e.*, one million cubic millimetres—contains one germ, how many will one hundred cubic millimetres contain?— $\frac{1000000}{1000000} = \frac{1}{10000}$.

We could, accordingly, even under the very liberal allowances I have made above, only once in ten thousand times expect to have one germ enter the root-canal. Again, suppose a particle of dust carrying a bacterium should be floating about the opening of the nerve-canal, and actually be drawn into it, if the walls of the canal

are moist with some antiseptic, as they should be during the operation, there is no possibility of its being carried far beyond the entrance to the canal before it lodges on the wall, where its passenger will be welcomed with a dose of antiseptic.

How, then, can we account for the "certainty that the opening into a so-called dead tooth would eventuate in pericementitis in a few hours"? It could at most happen only once in ten thousand times through air-germs; even then, only, on the supposition that the germ in question arrived alive somewhere near the apex of the root and there found proper conditions for its development. The possibility of particles of dust *falling* into the pulp-chamber during the operation is much greater than that of their being sucked or drawn into it. It may, accordingly, occasionally happen that in this way an air-bacterium gets into the root-canal. This applies, however, only to operations in the lower jaw, since, as we know, germs seldom fall upward. Culture plates turned upside-down may be exposed to the air for some time without much danger of contamination unless strong currents of air are present.

In dental surgery, particularly in the treatment of teeth with necrotic or putrid pulps, there are so many ways in which an infection of the periapical tissue may be brought about that it is not necessary to call into action the one-ten-thousandth of a bacterium, whose acquaintance we have made.

In the simple act of boring into the pulp-chamber we may carry more bacteria into it on the burr than are contained in a whole roomful of air. An unclean nerve-broach inserted into the root-canal may introduce a still greater number of germs.

Again, if in boring into the pulp-chamber we allow the drill to plunge suddenly into it, we are pretty sure to force some of the contents, if they are in a semi-liquid condition, through the foramen; especially is this the case where the drill is followed up by a burr.

Furthermore, simply wiping out the pulp-chamber with a large pledget of cotton or spunk, forcing a nerve-needle far into the root-canal, especially a needle which nearly fills out the lumen of the canal, or is wound around with cotton so as to act as a piston, may not only force bacteria through the apical foramen, but even particles of the putrefying liquid pulp, by which the infection is invariably seriously complicated.

I call attention in this connection to a series of experiments, recorded in the *Independent Practitioner*, July, 1888, in which mice were infected in a pocket at the root of the tail, some with

pieces of gangrenous or putrid pulps, others with pure cultures of bacteria from these pulps. The reaction was invariably much severer in the former case, as might be reasonably expected, since we have the combined mechanical and chemical or toxic irritation in addition to the infection, and in many cases this irritation makes an infection possible where otherwise the tissues would have resisted the invasion of the bacteria.

Again, supposing we have bored into a tooth without having previously sterilized its surface, if, in endeavoring to wipe out the pulp-chamber, we brush over the margin of the drill-hole with our cotton, we may collect large numbers of bacteria and carry them into the pulp-chamber, or, with our cotton, spunk, etc., and still more so with our instruments, we may introduce large numbers of bacteria into the canal, always bearing in mind the fact that we have to deal with a tube which is open at both ends, and in the majority of cases filled with infectious matter often in a semi-fluid condition, we can readily understand how in operating upon one end of the tube we may force some of its contents out at the other unless we carry out our operation with the greatest care and delicacy of manipulation. I have known the taking of an impression with Stent's compound to provoke a severe case of pericementitis simply from the pressure of the material upon the contents of an open pulp-chamber.

In all our operations upon teeth with necrotic or gangrenous pulps we should, above all things, most scrupulously avoid bringing any pressure upon the contents of the root-canal, either by use of too large instruments or by the careless use of cotton in wiping out the cavity, or by suddenly plunging an instrument of any kind into the pulp-chamber or root-canal, or in any of the various other ways in which pressure may be exerted on the contents of the canal.

The tooth operated upon should be as far as possible isolated and cleansed before beginning the operation; no foreign infectious material of any kind should be carried into the canal, either through access of the secretions of the mouth or through unclean instruments, and in particular the cavity of decay, if one is present, should be thoroughly cleansed and disinfected before beginning operations on the root-canal.

During the removal of the pulp, or the remains of the pulp, the pulp-cavity and as far as possible the root-canal should be kept bathed with an antiseptic. The operator should furthermore always bear in mind that the use of antiseptics does not do away with the necessity of exercising the greatest care and delicacy of manipula-

tion in the mechanical cleansing of the root-canal, particularly where the contents of the latter are in a state of putrefaction.

Since the operation of cleansing and filling root-canals has been carried out, I do not believe that among the millions of operations of this nature which have been performed there has been a single one whose success has been in the least degree hazarded by the introduction of air-germs.

GROWTH OF THE CEMENTUM.¹

BY R. R. ANDREWS, D.D.S., CAMBRIDGE, MASS.

IN the year 1858, Magitot, a French histologist, claims to have found within the follicle of a developing tooth a special organ for the development of the cementum. In 1861, Robin and Magitot made a presentation of the same facts anew. With the exception of these authors, I am not aware that any other authority has recognized the presence of this special organ; while such men as Kölliker, Waldeyer, Herz, and others have formerly denied its existence. In my own investigations I have not been able to trace it with certainty, although there are appearances in a fully-formed follicle of a tissue under the calcifying dentine-germ, between it and the outer covering of the sacculus, that might admit of the supposition of the existence of such an organ. I have noticed this appearance in sections from embryos from the pig and the calf. At a later stage, where the crown is further developed, there is also to be seen infoldings of the tissue at the base of the germ that may develop into an organ for the growth of the cementum, as stated by Magitot. But in teeth more matured, where the cementum has already commenced its growth, I cannot trace even the outlines of a special organ, although I do not consider my investigations to have been extensive enough to warrant me in denying its existence altogether.

Wedl, whose description of the development of the dentine and the enamel is so minute, has but little to say about the development of the cementum. He tells us that at the margin of the crown the dental sacculus contracts, and upon its inner surface the

¹ Read before the Section of Dental and Oral Surgery of the American Medical Association, held in Washington, D. C., May, 1891.

formation of the cement is affected, increasing gradually as the formation of the root advances. The lower segment of the dental sac becomes therefore the root membrane of the tooth. He believes with Tomes that Nasmyth's membrane belongs to the cement. Again, he states that the dentine and cement are connected together by means of a layer composed of an agglomeration of transparent globules of varying degrees of thickness. The spaces intervening between the latter (interglobular spaces) are irregularly notched, and frequently in very close proximity to one another. He considers that the cement commences outside of this layer, but some of my own sections show it as a dividing line. In describing the methods in which hypertrophy of the cement is formed, he speaks of the various sizes of the corpuscles which form it, stating that many of them have a glistening appearance. Smaller corpuscles are sometimes attached to the sides of larger ones, or are blended with them. Large and small ones also occur separately. These so-called corpuscles are, I believe, globules of calcoglobulin, forming, by merging into others, a layer of calcoglobulin that shall form the matrix of the hypertrophied cement.

Tomes tells us that it is difficult to point out any distinguishing structural character between primary bone and that of the cementum. The cells close to the surface of the forming cementum which were formerly called osteal cells have now been named osteoblasts. No bone is formed until after the appearance of this osteoblast tissue, and Rollet believes that these osteoblasts are essentially a new growth; they are so distinctly marked off that it almost assumes the character of an epithelium. If we harden a partially-formed tooth in chromic acid, and subsequently decalcify and cut it transversely through the root, we meet with the following structures from without inward: On the outside is the outer part of the sacculus, now the periosteum. Internal to this is a layer to which the name cambium has been given, consisting of roundish cells with processes. These lie in a reticulum made up of cells which give out a small number of homogeneous transparent processes. By the inosculation of these processes a net-work is formed. Between this net-work and the fully-formed cementum lies the osteoblast layer, consisting of much larger cells. As the osteoblasts form a continuous layer and are very numerous, it is obvious that only a small percentage of them ever form lacunæ, or bone cells, or otherwise retain their individuality. As the process of calcification goes on, the outlines of individual cells become lost in the general transparency of the matrix, only a cell here and

there remaining as a lacuna. Again, he states that contiguous osteoblasts become fused together by their exteriors, so that their individuality is lost.

Professor James Tyson, in 1873, writes: "Some difference of opinion existed as to the exact tissue which undergoes conversion into cementum, some alleging that it results from ossification of the tooth-sac, while others, among whom are Kölliker and Beale, believe it to originate in a soft stellate tissue, made up of branching and communicating cells, which are found upon the surface of roots of teeth, and within the tooth-sac. This tissue undergoes calcification, spherules of lime being deposited, which gradually fuse and form a transparent, intercellular substance. In this process not all the cells of the stellate tissue become lacunæ of the cementum, but some are obliterated by the deposit, and there are therefore fewer lacunæ in the resulting cementum than in the previous stellate tissue, while the canaliculi are much more numerous than the prolongation of the stellate cells, many of the lacunæ having thirty or forty prolongations, while the stellate cells rarely have more than from ten to twelve. The cementum is more slowly formed than bone and a more permanent, but probably less perfect, tissue; its matrix is harder and more transparent, in this respect approaching the dentine."

Klein tells us that the tissue of the tooth-sac represents the matrix from which the cement is formed; its structure and function are that of the osteogenetic layer of the periosteum, and that the formation of the cement out of that tissue is identical with subperiosteal bone.

My investigations show that, if we examine the developing tooth just after the cementum has commenced to form, we shall find that the matrix of the cementum is made up of masses or layers of that tissue which we find everywhere on the borderland of calcification, between the organic and inorganic substance. This is a tissue which Tomes has said was produced solely by the destructive action of weak acids, but that his conclusions are erroneous is proven by the fact that this tissue appears in sections where no acid has been used. It is a tissue formed by the coalescing of minute, globular bodies, calcospherites, into globules and layers of a tissue called calcoglobulin. The minute globules, in forming the matrix of cementum, seem to come from the osteoblasts, and form the calcoglobulin layer in somewhat the same manner as I have described and pictured in the developing dentine. The smaller globules by merging into each other form larger ones.

They have a glistening appearance, like fat-cells, are about the size of the osteoblasts, but are not cells, though often taken for them. They have no membrane and are without a nucleus. They are the bodies which Tomes and others say become fused together by their exteriors. Outside of the layer formed by the globules, the developing matrix of the cementum, we see a row of cells, which Rollet stated looked like an epithelium. They are the osteoblasts, or cementoblasts, and the granules that have been described in their substance are very minute calcospherites, which the cells give out to the forming matrix. Tomes has called them osteal cells. They are the same in appearance as those we see around the edge of the developing bone of the jaw. Just exterior to these cells we find roundish, nucleated cells with innumerable processes, reminding one somewhat of a stellate reticulum, only that the stellate character is not so marked. Just outside these we find the connective tissue which is really the periosteum. If there exists at this time a special cement organ, it must be formed by this slight amount of stellate tissue which is between the periosteum and the layer of osteoblasts that are against the forming cementum. In preparing my tissue, so as to have it as near life as possible, I made use of the same methods as were described in my papers on the development of the dentine and of the enamel, and I find that the osteoblasts, which are said to be full of a peculiar granular substance, are, when the tissue has been properly prepared, found to be filled with minute spherical bodies, which have a glistening appearance. Across the developing matrix of the cement are found numerous fibres, probably connective-tissue fibres, that are also found in developing bone. They were seen and described by Sharpey, and are named after him, Sharpey's fibres. They become calcified within the matrix.

As the cementum grows thicker we find that the developing matrix is infolding in its substance large nucleated bodies which appear to be connective-tissue corpuscles. They are somewhat larger than the osteoblasts, and are forming the cement cells, or lacunæ. They have a higher function than the osteoblasts,—that is, they are to give nourishment to the matrix, being connected with others by means of canals or processes, of which there are many, some of which run in the direction of the termination of the dentinal tubes, as though connected with them. When enclosed by the developing matrix of the cement, minute, glistening, globular bodies are seen within their outline, or membrane; indeed, it appears as though these minute globules were deposited on the periphery of the cell by the cell itself, and here fusing, give the cell

its peculiar characteristic shape, which is not as regular as that in bone, and is oftentimes very much larger. Their processes, probably, anastomose with the dentinal tubules through the interglobular spaces of the so-called granular layer, although I have never been able to trace them. I look upon the granular layer itself as a condition caused by an arrest of the developmental process, while the first layers of the dentine were being formed. It has its existence solely from the fact that in the first-forming layer of dentine the globules or calcoglobulin which form its matrix did not fuse together. It is exactly identical to the interglobular spaces found in the crown. The point that I would emphasize in this paper is that the matrix of the cementum is formed from a secretion of the osteoblasts, and this secretion is a multitude of minute globular bodies given out against the dentine. In a work entitled "General Biology," written by Professors Sedgwick and Wilson, they make a statement that the matrix of a tissue is composed of lifeless matter, which has been manufactured and deposited by the living protoplasm, constituting the bodies of the cells; and again, cells may manufacture a lifeless substance which appears in the form of solid partition walls between the cells, or as a matrix solid or liquid in which the cells lie; and again, the cells are small masses of living matter or protoplasm, which deposit more or less lifeless matter either around (outside) them or within their substance. The lifeless matter which is given out by the osteoblasts to form the matrix of the cementum is in the form of these minute globules, and these fusing together form larger ones, which, merging, form layers of an uncalcified substance that Professor Harting has named calcoglobulin; this is by further calcification to become the calcified matrix. In speaking of the formation of exostosis, Tomes states that at the junction with the root he finds a substance that is dense. It is torn with difficulty, and under pressure slips about between the two glasses. It is gelatinous, osseous matter, and with it may be seen rounded, amorphous molecules. This is a good description of calcoglobulin. Tomes says that cementum is not developed by a direct metamorphosis of the periosteum, but by the calcification of a new growth. Cells are produced, the individuality of which becomes lost in the process of calcification; the interior of the cells seems stuffed with an opaque and dense substance disposed in large granules, among which the nuclei cannot positively be pointed out. The large granules within the cells are really calcospherites, and careful preparation of the tissue will clearly show them. The merging together of these globules forms a layer, and this calcify-

ing, layer after layer, gives to the cement the peculiar laminated appearance that is so often seen. It is by no means difficult to trace evidences of this globular formation in the cementum of fully-formed teeth; indeed I have several sections of human teeth that show the outlines very clearly,—so clearly, in fact, that one might call it the interglobular spaces of the cement, probably caused from some arrest in the full development of the tissues.

DENTAL INFIRMARY PATIENTS—THE USE AND ABUSE OF DENTAL CHARITY.¹

BY RICHARD GRADY, M.D., D.D.S., BALTIMORE, MD.

MY object in this paper, Mr. President and ladies and gentlemen, is to call attention to the abuse of dental charity, to illustrate its magnitude, and to protest (as every honest and independent man who wishes well to the profession and to its respectability should) against the looseness with which dental colleges dispense their so-called charity,—to “condemn the fault and not the actor of it;” for silence would give an indirect sanction to practices which are lowering the profession in public estimation. So, judging of the proprieties and obligations of my position, I place the statements—dental infirmary patients: the use and abuse of dental charity—together, and propose to consider them in connection, because the evidence in regard to them constantly mingles.

You gentlemen, familiar as you are with recent medical literature, if not appalled at the rapid growth of the dispensary evil, fully realize that it is an evil, that it is taking the means of livelihood from many deserving men, that it is growing, and that it must be combated to be kept within proper bounds.

The sorrows of our cousins across the ocean have been told you in the medical press. “The dispensary abuse in other lands,” “the startling excess of medical charity in Edinburgh,” “the abnormal growth of the out-patient department at Cambridge,” “the great and urgent question of hospital reform” in Birmingham, where the out-patients of hospitals “have advanced in twenty years, 1867 as

¹ Read before the Section of Oral and Dental Surgery of the American Medical Association, held in Washington, D. C., May, 1891.

compared with 1887, from 67,000 to 166,000," etc., have been commented upon. "Almost one-half of the people of Edinburgh, Scotland, receive their medical advice gratis. (The population is little over 236,000, and 103,095 dependent on charity for medical advice!) Nor is this all. The number of persons who in any year actually avail themselves of such aid must of necessity be smaller than the total number who would do so were they forced by sickness or accident; and it looks as if more than half the population were in the habit of expecting medical treatment gratis."

In the city of New York wealthy hospital magnates are teaching the people the lessons that they have already learned in Edinburgh. In New York the amount of free work done in hospitals has increased ninety per cent. in the last decade. In time the hospitals may become as much an enemy to the general practitioner as the dispensary is. A Western medical editor, who last summer visited some of the hospitals and clinics of the great metropolis, is quoted in the discussion of the question, "Should a poor man study medicine?" as saying, "What was most striking, outrageous as it is, was the great number of well- and fashionably-dressed, evidently well-to-do people, both male and female, who applied for free treatment. At the ———, on Tuesday, August 12, there were five hundred and sixty-eight patients, and, judging from their appearance, we venture to say that three-fourths at least of them were abundantly able to pay for private medical advice. The profession in New York would be justified," he says, "in arising in emphatic and effectual protest against such wholesale diversion of their revenues."

Why do I recall these things? Not simply to remind you that this co-operation of the medical journals with the medical profession is an excellent example to the dental journals and the dental profession. As far back as March, 1889, I wrote to the *Dental Cosmos* to ascertain if anything on "dental charity" had ever been published. The reply of the editor was, "I do not recall that the subject has been discussed in any dental journal, and I feel quite confident that it has not been in the *Dental Cosmos*. The subject is a delicate one because it concerns a natural but sometimes unprofessional rivalry between dental schools in the same city."

Concerted opposition to dental infirmary abuse has been organized in Baltimore, and the Maryland Dental Protective Association, composed of a majority of the practising dentists in that city, not including those pecuniarily connected with dental schools, came into

existence February, 1890; the object of the organization being to regulate the administration of dental charity so that the greatest good may come of it. The members, believing that the impulse must come from the dentists rather than the colleges, are doing what they can to obtain an abatement of the evil which is making such inroads into their practice. Nothing so far has resulted from the movement except the adoption of a resolution,—

“That each of the dental schools be requested to place in the infirmaries (near the entrance) record-books in which shall be printed in bold type on each page, ‘For the poor only,’ and in which shall be entered the name and address of all applicants for dental services. After such registration each applicant shall receive a card also headed ‘For the poor only,’ if he or she admits inability to pay the usual office fees; all others shall be rigidly excluded from infirmary privileges. This card shall be retained by the patient and presented at each visit, and until the completion of all necessary services, when the card (endorsed by the operating student with his statement) shall be returned to the demonstrator and placed on file. The record-books and the cards shall be open for public inspection at all reasonable times.”

The president of the Association has also visited the mayor of the city to request that no appropriations be made the dental schools for 1891 unless in the contract there be included a provision that (1) all applicants for dental services shall be registered, and (2) that the record-books be open for inspection. Appropriations of four hundred and five hundred dollars had been made in 1888 and 1889 to one of the dental schools “for supplying medicines to the indigent sick of the city of Baltimore.”

In what follows I wish it to be understood that I have no reference to any special college. My remarks are addressed to the system generally. Many of the facts are calculated to arrest the attention and engage the study of the best men in the profession.

Believing that every reform was once a private opinion, and, acting upon the advice of Emerson that “that statement only is fit to be made public which you have come at in attempting to satisfy your own curiosity,” I, judging it expedient to gather light from quarters deemed trustworthy, wrote to deans of dental schools to determine whether dental college infirmaries truly deserve the designation of charities. The general result of the inquiry confirmed the impression that there is an enormous abuse of so-called dental charity by the almost reckless admission of all comers, and that the practice of some colleges is large and pecuniarily profitable.

As no man's personal rights are in the issue, I give you some of the information elicited as to infirmary charges and infirmary practice:

1. "Our infirmary privileges are extended only to those unable to pay the usual office fees (all others are rigidly excluded); gold fillings, seventy-five cents to two dollars and fifty cents; amalgam and other plastics, twenty-five cents to one dollar; vulcanite (full upper or lower), five dollars and fifty cents; gold or continuous gum, twenty-five dollars; no record of 'charity patients' to whom relief is extended without fee other than extractions and pathological cases."

2. "The charge made is intended to cover actual expense of materials used and whatever may be used in a charitable way; there is usually a surplus of receipts over expenditures; minimum charge for filling with gold, fifty cents; for dentures, six dollars; these amounts vary, of course, if a large quantity of material is used or in the case of dentures being made on metal bases."

3. "The dental college charges simply for material used in plugs and dentures, and tries to avoid doing for people who are able to pay regular dentists."

4. "We average about eight thousand patients of all kinds yearly; charge for gold fillings and other work about what material costs, estimating rather over than under, as we can't afford to lose by our good works."

5. "The fund we collect from our clinics amounts to about five thousand dollars per year of ten months, while we are in operation."

6. "Charges are slightly more than cost of material; we aim to have the infirmary self-supporting."

7. "We try to have the charges for material used cover the waste and as much of the running expenses of the infirmary as practicable."

8. "Gold for about one thousand patients, for which a profit is charged; make no distinction in patients."

9. "No regular tariff for services; endeavor to discourage well-to-do by making charges higher than in office."

10. "Charge for gold filling about one-half what dentists charge."

11. "Our purpose is to make infirmary self-sustaining, etc."

The true work—the only legitimate work—of dental colleges should be to educate students for professional life, to perfect the professional education of the dentist. But this preliminary train-

ing should not be used, as it sometimes is, to lower the dignity or emoluments of private practice. For pecuniary interest, some Faculties attract as many students as possible (over three thousand one hundred were in attendance at the various dental colleges of the country for the session 1890-91), whom they send forth in the spirit of rivalry into the ranks of the profession without a thought that the means for subsistence for these men is diminished by dental infirmaries taking patients which these graduates should have, that having raised up these men to professional life they have the further duty not to pull them down, and that they are warring upon the livelihood of their professional brethren. Is it any wonder, then, that men often lose heart after struggling for a time against so powerful and so unscrupulous a rival as every dental college infirmary is, whose anxiety for abundance of clinical material is so pressing that there is no discrimination, or hardly any? and that men of talent and respectable professional ability are forced to adopt rates that will in a measure compete with clinical fees in order to secure at least a moderate share of practice, or be driven out of the profession to find support in some other occupation? Have members of the dental profession no feelings which influential dental colleges are bound to respect?

More than fifty years ago, as you know, the *first* dental college was founded. It was the purpose to give the institution a high character at the start. After it had become necessary to establish an operating infirmary, "for the benefit of the students," this announcement was published:

"There exists abundant opportunity for practical instruction in the dental infirmary attached to the institution. The appreciation and consequent demand of such operations as are here performed are steadily increasing among the indigent of our city. It may be necessary to add that these operations are not performed by the professors in the presence of the class, but by the students themselves under the immediate eye and direction of their instructors. In fine, the object of the institution is to perfect the professional education of the dentist, which may or may not have been begun under some competent private instructor, and which, it is recommended, should be pursued during the summer vacation in some dental office."

Has the stamp of character the infirmary then received endured?

The origin of the dental infirmary has been told you. The evolution of the abuse can readily be traced.

1. "Operations among the indigent." "All expenses borne by college."

2. "Students have the privilege of operating upon their own private patients."

3. The natural development has been that services have been rendered infirmary patients who could pay a proper fee; that "during the sessions the operative and mechanical departments are now so well patronized that every student can obtain as much practice as is possible for him to attend to;" that "the clinical material is abundant, there being an excess of patients;" that "the practice for dental students has increased to such an extent that all the students during the past session have had an abundance of practical work in both operative and prosthetic dentistry,—the record-books showing to the credit of many of them hundreds of gold fillings inserted for infirmary patients, besides other operations. This means for practical instruction has already assumed such large proportions that the supply has been beyond the needs of the large classes in attendance during the past sessions."

That the competition of some dental college infirmaries affects to an appreciable degree dentists injuriously will be obvious to every reflecting person at the bare mention that "about twenty-five thousand patients are attended to yearly" by one dental college, and "on an average for nine months in the year relief is extended to about one hundred patients a day" by another; that one dental college which was "extending relief to more than two thousand charity patients" in 1889 reported next year (1890), "more than ten thousand of such cases," and another which reported in 1889 "the charity patients number four thousand three hundred and twelve," in 1891 (two years later) gave the number of cases "twelve or fifteen thousand."

This competition is most onerous to the dentists of least income, and to the practitioners who are struggling against the odds of cheap dentistry in an effort to maintain an honorable position and eke out of their labors sufficient income for a respectable living. The dental infirmaries being open to all classes and conditions of men and women who desire low-priced services, few, if any, questions are asked so long as the charges are paid, no matter how elegant and costly the habit nor how many jewels displayed. This pernicious example of cheap dentistry is an injustice to those dentists who resist mercenary competition and endeavor to render their bills in conformity with standard fees.

Are there not poor enough to supply "clinical patients" without

encouraging the well-to-do to degrade the profession by responding to the enticing and seductive advertisement, "Many of the operations are performed free of charge, and all others at the cost of materials only," or the knowledge that "during the first two months of the session we furnish all materials to patients free of cost," although it may be said in excuse of the work done for them, "the operations are faulty and but the handiwork of students?" Is it not true benevolence and sound policy to remove, if possible, competition from those least able to bear it? If fair-minded men think so, if the Faculties of dental schools think so, then let the welfare of the whole profession supersede and extinguish the selfishness of the few.

A dentist who would endeavor to obtain practice after the model of the pretentious dental infirmary announcement—"free to all—all operations known to modern dentistry performed in most workmanlike manner; gold-foil and artificial teeth at actual cost; amalgam or silver, white, tin, and gutta-percha fillings free; this is the first time such an opportunity has ever been presented to every one to save those important organs (the teeth) free of cost; old and experienced demonstrators in charge; the same decorum will be observed as in private office, etc., etc."—would be accused of unprofessional conduct, of acts unworthy the lowest grades of the profession, and set down among his fellows as unprincipled, a professional outlaw fit to "send to Coventry."

However painful it may be to admit, it cannot be denied that methods which are legitimate for a dental college are not improper for the individual dentist, although claimants for public patronage may not see the question in this equivocal position after they have worked themselves into dental college Faculties.

But the effects of the practice are not worse than the statements in the advertisements. One of the most pregnant counts in the indictment against the dental college infirmaries is that they advertise "gold-foil and artificial teeth at actual cost." Dental colleges should give an equivalent for the fees they demand: to do *more* is charity, to do *less* is fraud.

Lest it should be thought that I am making statements to suit my argument, let me quote what those think who ought to know best, from the opportunities of observation and experience. The views expressed by the gentlemen are creditable to their sense of justice, and will have such weight with the membership of this association and with others as they are entitled to.

Dr. Shepard, president of the Massachusetts Board of Registra-

tion, whose caustic criticisms are fresh in the minds of readers of dental literature, says, "Suppose one college furnishes only No. 3 gold in the infirmary, and sells each sheet for seventy cents, making a profit of sixty dollars per ounce, and another college furnishes No. 4 gold, and sells it at forty cents a sheet, making a profit of fourteen dollars and forty cents per ounce, would it not be reasonable to infer that the former was run more for profit to the college and the latter more for the advantage of the student?"

The testimony of Dr. Genese, who holds official position in two dental schools, is: "It is well known that persons amply able to pay (occasionally persons of known wealth) claim the attention of the students, and needed charity kept so long waiting that they depart or do not get the work done, as the charges are sometimes as much as a young practitioner will make. Where is the charity? and how does the dental infirmary compare this with only 'cost of material'?"

"No student should be allowed to appoint time for people to visit him at the institutions. Every patient should be first seen by the demonstrator and the work given in rotation to students. The name and address and occupation of the applicant should be obtained, and if found able to pay should be referred to a dentist, and not, as at present, charged full fees to go into the pockets of the professors and demonstrators."

Dr. Ferdinand Groshans, a demonstrator is of this belief: "From personal experience at the dental infirmary as student and assistant I could cite cases of patients who were able to pay and had their teeth filled and plates inserted to their own disadvantage as well as to the injury of the science of dentistry, both of which are due in my opinion to the want of a larger number of instructors as well as to the inexperience of the new beginner. I think a less number of patients would be sufficient and of more value to the student if the instruction would be more of a personal supervision and more constant by the demonstrators in charge. I do not think a student should be left so much to himself as is the practice at present. The infirmary practice as at present conducted is detrimental to the patient, student, college, and the profession in particular, to say the least, and not considering the practitioner who must live by the legitimate practice of his profession." These views a vice-president of the National Association of Charities approved, and added, "We want fewer unworthy applicants and a better service in the dispensaries."

Dr. J. L. Asay, of California, writing on "the pernicious effect

of dental college clinics," says, "That such a condition exists was to me made apparent during my visit to the larger cities of the Atlantic coast last year, but was not confined to any particular dental school. I found it, however, to predominate in Philadelphia, where there are no less than three dental colleges. It may possibly be that I observed this state of affairs more in that city than in other places from the fact of my larger acquaintance there than elsewhere, it being my native city and former residence for twenty-seven years; hence other localities may furnish equal grounds for comment.

"During the visit to which I have alluded, I frequently heard old practitioners complain of college operations and their fees. I heard men and women of good circumstances and comfortable incomes congratulate themselves and each other upon how cheap they had got their teeth filled or plates made at the dental colleges. We may rail against gas-offices and bucket-shops, five-dollar sets of teeth, and 'teeth plugged to last for life for twenty-five cents' without avail, so long as we countenance the pernicious example of cheap dentistry and low fees by our institutions of dental learning to those who should be compelled to seek the services of the regular practitioner, and pay a price equivalent to the time occupied and the skill employed."

This expression is confirmed by an official in Philadelphia under date of April 30, 1891, who writes: "In this city, with its three large dental schools (having in attendance over seven hundred students during the last session) actively competing for patronage, the evils of indiscriminate charity are seriously felt by a large number of worthy practitioners. Such charity certainly tends to cheapen the services of the dentist and in many cases causes young graduates to resort to questionable methods of obtaining a remunerative practice. The question is of vital and timely importance."

In conclusion, what is the duty of the hour? What, it may be asked, do members of the dental profession propose for the evil which they allege to exist so much to their prejudice and detriment? Is it to close the dental infirmaries? Not at all, except, possibly, during the vacation when no lectures are delivered; because in our present social condition the dental infirmary may be necessary (I will not say necessary evil). They suggest a cure more humane, more salutary, more manly, more worthy of them. It is that dental infirmary privileges be extended only to those unable to pay the usual fees of dentists, because it is believed that the practice of dental schools in throwing open their doors to who-

ever may apply injuriously affects both the public and the dental profession. (The testimony upon this point is so honorable to the dentists of Baltimore that special attention is invited to it, as it has been affirmed and re-affirmed by members of the Maryland Dental Association, and is in fact the sentiment that led to the organization.)

I suggest the following for consideration as possible remedies; other thinkers may be stimulated to supplement what has been omitted. Oneness of aim does not imply identity of means.

1. Go back to the practice of the time-honored pioneer: an operating infirmary "for the benefit of the students," operations "among the indigent" only "by the students under the immediate eye and direction of their instructors," "all expenses borne by college."

2. Let no "students have the privilege of operating upon their own patients (private) during the sessions," either at the college or at their homes.

3. Provide for dental infirmary privileges to persons recommended by dentists or by some inquiry agency familiar with the circumstances of applicants, similar to the Charity Organization Society of Baltimore.

These are simple suggestions, and it only remains for the dental colleges, more especially rival institutions in the same city, or those which "aim to have the infirmary self-supporting," or have a "surplus of receipts over expenditures," to put them in practice. Even if it had been found difficult to devise remedies, the calling of the attention of the public to the evil would have been useful.

The interests of the dental profession and of the dental colleges are really identical, and they should be made practically so. At present there is a combat between those with whom unanimity of purpose and honesty of intention should prevail. Each sets the other at defiance, and as a rule there is little kindly feeling and few friendly acts on either side. It would be otherwise if the graduates of dental schools, instead of having to suffer from acts prejudicial, or sometimes injurious, to their interests were made the objects of a generous parental care. Such consideration would dispel antagonism, and the charity of the public could be confidently appealed to with the support of the profession, notwithstanding there would be (apparently) a falling off in the number of patients at the dental infirmaries.

This is an age of associations, hence it is desirable that State societies be formed which shall co-operate in protesting emphatically against the abuse of dental charity and in taking effectual

measures for its correction, so that in case of application for State or municipal (financial) aid on the plea that "the Faculty are receiving now scarcely any remuneration, they ask that they be relieved from the cost of the very charitable institution which they have necessarily connected with the college;" or "the Faculty find themselves compelled to ask aid from the State; they are not willing that the institution shall perish without giving the State an opportunity to preserve it," it may be made known that no such assistance is given in the cities of Boston, New York, Philadelphia, Washington, Chicago, Indianapolis, Cincinnati, Louisville, Minneapolis, or San Francisco by the tax-payers to dental schools.

DENTAL RESPONSIBILITY FOR EARLY DIAGNOSIS OF TUMORS OF THE MOUTH AND JAWS.¹

BY ARTHUR K. STONE, A.M., M.D.²

WHEN your president asked me to write a paper for your Academy on tumors of the jaw I supposed that I had a fairly easy task before me. But after spending some time in looking over the literature of the subject I came to the conclusion that to write an article which should be of any practical value would in reality be a very difficult task. Therefore I feel that I must ask your indulgence and good nature for the shortcomings of this paper.

The first thing that strikes one who is making a study of this subject is the fact that its literature is filled with reports of mammoth tumors, unique specimens, and rare cases. These are dwelt on at great length and pictured in all their horrors, and the idea is given to the student that the terrible tumors are of frequent occurrence, while, in reality, this is not a just conclusion, for upon careful investigation of the reported cases and the articles in the "Systems of Surgery," both general and dental, the fact is developed that the pictures and the cases are repeated time and time again. In fact, many of the cases have, so to speak, become the stock in trade of writers on tumors of the jaw. And with these they have covered up the important, common, every-day facts, so that

¹ Read before the American Academy of Dental Science, Boston, May 6, 1891.

² Surgeon to the Boston Dispensary.

they can hardly be found. Even Sir Christopher Heath, in his most recent article, bases his arguments upon specimens which have been in the museums since 1834 and 1847.

It is obvious to you all that such giant tumors can have no real interest to you as dentists, or, in fact, to practitioners in general. They are interesting to us as rarities; and they are interesting to the hospital surgeon who may have them to remove, provided, of course, that he is anxious for that sort of an operation; and you and I should be pleased to see the operation, but we should feel thankful that we did not have the responsibility on our shoulders.

These large tumors are the interesting tumors, so called, but fortunately they are extremely rare. That these new growths monopolize to such an extent the literature of the subject is but a fair example of much of the medical teaching. We are taught the uncommon and rare things with the same or even more emphasis than we are taught the things of every-day occurrence. In fact, the young man in medicine has to spend a good part of his first years in practice in forgetting the freaks and learning to recognize the common, no matter under what guise it may appear. I hope that the dental teaching is much wiser in this respect.

New growths of the mouth and jaws, though common, medically speaking, are really rare. But the importance of their early observation and consequent accurate diagnosis cannot be overrated. And it is in the power of this society to do much to make severe deforming jaw operations largely unnecessary. By this I mean that in continually searching the mouths of your patients you have the best opportunity to discover new growths in their earliest stages, make an accurate diagnosis, and carry out proper treatment before the disease, if it is malignant, has gone so far that only a severe operation will suffice. Not only can you do this, but the responsibility of not doing it must rest upon you. If you will consider all tumors and ulcers about the mouth and jaws serious until an absolute diagnosis has been made, much of the terror of malignant disease of the jaw will be lost.

To accomplish this desired result, it is necessary to know—

1. What new growths are liable to be found on the lips, jaws, and tongue.
2. What the growth under consideration is.
3. The appropriate treatment.

The first requisition can come only from familiarity with the subject in the various text-books and a study of reported cases.

Second, diagnosis in doubtful cases, thanks to cocaine, can often be absolutely settled by the pathologist; while the appropriate treatment must frequently be left to the surgeon, who may need all the resources of a well-equipped hospital to enable him to treat the case in a proper manner.

A most common form of tumor of the jaw is a simple inflammatory condition due to irritation occurring about an unremoved fang of a tooth. With this as a starting-place, the pus can soon infiltrate the tissues, causing partial immobility of the jaws, on account of the large, boggy swelling of the surrounding parts, foul breath, and a general malignant appearance. Such cases are specially for the dentist to diagnose. The surgeon is apt to think too strongly of malignant tumors, and, not being so skilful in working in the small space afforded by the nearly closed jaws, easily misses the offending root and demands a radical operation. Besides, his unfavorable prognosis will unnecessarily frighten his patient. Care and patient investigation will reveal the old fang or bit of dead bone, and, when these offending causes are once removed, antiseptic applications and cleansing mouth-washes will usually quickly return the jaw to its normal state.

The ulcers of the jaws and tongue next deserve mention. They are of special importance, as in their early stages accurate diagnoses are impossible. Ulcers of the lips do not come within the scope of this paper, though it may be well to state that a really common form of ulceration of the lips—*i.e.*, cancer of the lower lip—can, by its secondary deposits, involve the jaw. But early recognition of the disease, and operation, will probably prevent this disastrous result. The operation is comparatively simple and *can* be done with cocaine.

Ulcerations in the mouth may be simple inflammatory conditions, due to the irritation caused by the sharp edge of a decayed tooth upon the tongue, cheek, or gum, or may start from wounds of the mucous membrane, caused by toothpicks or other like things held in the mouth. Sometimes the ulcerations are due to syphilis or tuberculosis, or, it may be, to malignant disease. All these ulcerations have the same general appearance at the beginning, and it is only after careful observation that one can say that a given lesion is cancer, syphilis, tuberculosis, or a simple ulcer. In order to make the diagnosis, the position of the ulcer must be thought of. If it is where irritation from the sharp edge of a tooth or a mass of tartar can occur, the exciting cause must be removed at once and simple measures adopted to heal the ulcer. This will usually suc-

ceed, and in a few days the ulcer will disappear. But if it does not, valuable time must not be lost by making fruitless efforts to check a malignant disease. Under cocaine the surface can be scraped, or a part, a mere scrap, removed, and proper examination will probably show whether the sore is tuberculosis or cancerous.

The position of the ulcer, if it is on the tongue, may give a hint as to the diagnosis. Syphilitic gummata almost always occur on central portions of the tongue, while the cancerous and tubercular are usually on the side.

All ulcerations may have indurated bases, but epithelioma more frequently presents a hard indurated mass lying beneath the ulcer than any of the other forms. And the same is true of the neighboring lymphatic glands; they are more frequently enlarged in cancer than in the other lesions.

Mucous patches rarely occasion any great amount of trouble in diagnosis, so I will do nothing more than mention them.

In passing, it may be well to state that a man, or a woman either, can have a chancre on the lip or tongue; it is commonly near the tip of the tongue, and the induration and enlarged glands are as a general thing well marked. Try for a history, and that will settle the diagnosis. A quiet dinner, with some champagne, etc., followed by a little trip in the town, two or three nights before the appearance of the ulcer, will be pretty conclusive evidence as to the nature of the disease.

A common form of tumor seen in the mouth is the ranula. This is a cyst of one of the ducts through which the saliva of the submaxillary or the sublingual glands is conveyed to the mouth. It is caused by a stoppage in either the ducts of Wharton or of Rivini. By the plugging of these ducts the saliva is dammed back, the duct is distended, and the cyst formed. Bryant states that this is not the fact, but that the cyst is always in the mucin glands in the floor of the mouth. Examination of the reported cases shows that the so-called ranula may come from any of the above-mentioned causes. The diagnosis is easy, as the tumor is evidently cystic in character with clear, fluid contents, and careful examination will show that it is located entirely on one side of the frænum of the tongue. If there be any doubt as to the diagnosis, an exploring needle will show the contents to be clear, glairy fluid, either mucin or saliva. Sometimes simple evacuation of the contents is all that is necessary to effect a complete cure. At other times a piece must be cut out of the cyst-wall and the interior packed with gauze in order to allow it to granulate. Before passing on, it may

be well to remark that a salivary calculus may be the cause of the stoppage in the duct. In such a case the presence of the stone must be determined and its removal secured before a cure can be effected.

Cysts of the jaws may be divided into three classes :

1. Simple cysts, with simply watery contents.
2. Dentigerous cysts, which in addition contain a tooth.
3. Multilocular cysts, or, as they are sometimes called, cysto-sarcomata or cysto-adenomata.

The first two varieties are benign in their growth, while the third may be either benign or malignant.

Simple cysts may spring from beneath the periosteum, and, if situated in the lower jaw, bulge the inner part of the alveolus so that they appear more prominently in the mouth than externally.

The other variety of simple cyst has its origin during the embryonic period of the tooth-follicles before the formation of the dentine and enamel. Their growth is usually slow and painless. If they attain any size so that the bone over the cyst-wall is sufficiently thinned, pressure over the tumor will give the so-called egg-shell crackle. The contents, as already mentioned, are clear and watery.

The dentigerous cysts are those which in addition to the fluid contents also contain a tooth, or the remains of a tooth, commonly one of the permanent set of teeth, though it must be borne in mind that an adventitious tooth may be the exciting cause. The crown of this misplaced tooth is usually perfect, while the roots are for the most part absorbed. To establish a diagnosis the absence of some one of the teeth is to be considered; if the bone is thin enough the crackle will be present. While the exploring needle, especially in the hand of the dentist who is skilled to distinguish between bone and enamel, will in many cases disclose the presence of the tooth at the bottom of the tumor, and the escaping fluid will show the cystic character of the growth.

The above-described cystic tumors are generally slow of growth and give but little pain. Where there is little or no deformity there is no reason for urging the removal of the tumor, as there is no danger of its ever assuming a malignant character. And, furthermore, though it may be growing comparatively rapidly for the time being, it may cease before it assumes unpleasant proportions and never give further trouble.

It must be remembered that the strange position of the growth must not make you hesitate in making a diagnosis, providing that

other things point to the cystic character of the tumor. There is, for example, among the strange cases on record, one where a cystic tumor caused by an almost perfect canine tooth was found on the palatine vault.

Operation upon the cysts of the jaw consists in cutting away part of the wall of the tumor, the removal of the tooth at the bottom of the cyst if it is present, and then packing the whole cavity with gauze and allowing the cavity to fill with granulations.

The multilocular cystic tumors are of a rather different nature. They occur almost always in middle or advanced life. In younger subjects they are apt to be slow-growing, without manifesting any special tendency to spread and involve the neighboring parts; yet as the patient becomes older the tendency to malignancy is much greater. And when the growth is removed, unless great care is taken to include all the parts involved, the tumor is practically sure to return. The multilocular cyst is more frequently found in the lower than in the upper jaw. It starts as a small swelling near the socket of the tooth and slowly increases in size. Sometimes it attains large dimensions. The tumor grows within the substance of the bone, gradually expanding the compact wall, which forms a more or less complete capsule. The size of the various cysts varies from an extremely small, honey-combed condition to those which are a half-inch in diameter, or even larger. The septa between the cysts are generally ossified.

The contents of the cysts vary even in the same tumor, in some cases being clear and limpid, while in others almost gelatinous and of a dark-brown color, due to presence of blood-pigment. The histological examination shows a marked resemblance between the tumor and the enamel organ. In the tumor the alveolar walls are covered with a columnar epithelium resembling the inner layer of cells of the enamel organ. And these cells enclose a gelatinous tissue which preserves traces of a net-work of stellate cells which is comparable to the gelatinous tissue in the centre of the enamel organ. On the other hand, there are several cases where the tumor was evidently the result of an ingrowth of the epithelium of the gums. When the tumor has attained large size, some parts fluctuate and some parts crackle, while the general feel is rounded and lobulated. If the disease is located in the upper jaw it is hard to diagnose from solid tumors of the antrum, unless the cysts are unusually large. The rate of growth is very slow, and there is but little tendency to invade the surrounding parts or glands, and still

more rarely do they invade the whole system. Yet when appearing late in life these tumors may manifest a marked tendency to extreme malignancy.

Under the general term *epulis* is understood those tumors which spring from the periosteum of the alveolus. These tumors may be either simple fibromata or sarcomata, or, very rarely, epitheliomata. *Epulis* means simply "on the gums;" but the growth always starts from the periosteum,—usually from the periosteum about a decayed or decaying fang. The disease is commonly seen in young adult life. The tumors may grow to large size and give much trouble from their mechanical pressure and obstruction alone. But such cases, though once apparently common, are now rare, as an early operation is as a general thing the rule and not the exception. *Epulis* usually makes its appearance between two teeth, looking at first much like a bit of hypertrophied gum-tissue. But before it attracts notice it has commonly passed this stage, and it is quite plainly a new growth when the patient presents himself for consultation. If the tumor is a simple fibroid it is apt to be quite tough, while if it is a sarcoma it will be probably soft and vascular. As it grows larger the teeth are separated, and there may be some neuralgic pain, though on the whole the tumor is painless in its growth.

Should the attending physician simply content himself with a removal of the growth, he will find that its return will be only a matter of a few weeks. Something more radical is demanded; how much, depends on the diagnosis. Here is a most favorable chance to make a differential diagnosis. By the use of a little cocaine, and a one-per-cent. solution is all that is required to accomplish the desired result, a piece of the tumor can be secured and sent to the pathologist, or a fresh section can be made with a good sharp razor. Examination with a low power of the microscope will probably settle the matter, as the difference between a large-celled sarcomatous tissue and a fibromata is well marked. On the result of the diagnosis depends the operation to be recommended. One or two teeth must be sacrificed at all events. But if the new growth is a fibroma, and not large, thorough scraping of the periosteal surface from which the tumor springs will usually suffice to prevent its recurrence. If, on the other hand, the tumor is a sarcoma, a goodly piece of the alveolus must come away in order to get beyond the disease. In case the very rare form of cancerous *epulis* should appear, a guarded prognosis must be given as to the absolute success of the operation. And at the time of the opera-

tion a much larger piece of the alveolus has to be removed, and if there is the least suspicion that the disease has invaded the jaw-bone itself, there should not be the least hesitation on the part of the operator to do a much more serious operation.

The sarcomata in general differ in their malignancy according to their cell-formation. Some have a tendency to rapidly invade the neighboring bone and tissues, while others grow slowly and are almost benign in their nature. At times they are characterized by the formation of bone and cartilage in their substance, and are then known as osteo—or chondio—sarcomata. But such fine points are of special interest to the pathologist and to the surgeon after the tumor has been removed, as thereby he is able to make a more accurate prognosis.

New growths of the antrum present so many difficulties in diagnosis and operation as to deserve a much more extended treatment than I could give in this paper, therefore I will not speak of them at all.

I have endeavored in the preceding pages simply to suggest and indicate to you the most common varieties of tumors which you may at any time run across in your practices. But as a class, tumors of the jaw are fortunately rare, and no man can expect to see enough of them to make him absolutely sure of his ground in all cases. But every one should know enough to see when it is necessary for him to shift the responsibility of any given case from his shoulders to that of a surgeon, who has all the equipment for the most severe operation which the necessity of the case may demand.

A COMPARISON OF THE METHODS AND SURROUNDINGS OF ENGLISH AND AMERICAN DENTISTS.¹

BY WALDO E. BOARDMAN, D.M.D., BOSTON, MASS.

I WILL give a few facts gleaned from observation and practice during several months in the west of England, in the summer of 1889, while in charge of the large and lucrative practice of an American dentist during his absence in the United States.

We have been informed by practitioners in dentistry in foreign countries that their patients will not submit to an elaborate opera-

¹ Read before the Harvard Odontological Society, November 29, 1890.

tion upon the teeth and contiguous parts, nor sit in the chair for a greater period than half an hour, on the average, as do Americans, nor allow that degree of punishment in the extraction of roots or broken-down teeth.

Entering upon the discharge of my duties without previous information regarding an English practice and without introduction placed me in some embarrassment, though my coming had been announced and I was cautioned to "deal as gently with patients as you can, for they dread pain in England more than Satan." I endeavored to follow the golden rule.

This practice was composed of an educated, wealthy, refined people, members of Parliament, the clergy, and many retired army and naval officers, with their families, who reside in the west of England, being the gentry of the counties embraced in a radius of thirty-five or forty miles.

I have been told that an Englishman bathes as often as anybody, that he takes pride in having his tub with him wherever he goes; yet he uses the tooth-brush sparingly, and allows his teeth to decay until ready to be "pulled out," and substituted by what he regards as better ones, inasmuch as "false teeth" do not ache; that they take little care of the organs of mastication and place a low value upon them, and only go to the dentist when a tooth aches. It is puzzling to understand how people, cultured, refined, and wealthy, can tolerate so much uncleanness in the oral cavity.

Personally, I do not share the same feeling which my English brother has regarding the aversion of the English to an extended operation. My experience taught me quite otherwise. I found the average patient agreeable and sociable, willing to submit to a much longer sitting than I could give if advised to have a tooth removed; they did not require an explanation, but acquiesced.

When they place themselves in the chair they presume the dentist to thoroughly understand his profession and will use his best judgment in the case before him. The average English patient knows less than his American cousin regarding dentistry, nor does he desire any reason why it is thus and so; simply do the work and render the account when completed.

If advised to have a plate, whole or partial, they usually accept the advice as for the best, the expense not entering into the calculation as a rule.

Although in nearly all cases they were favorable to the extraction of worthless teeth and roots, yet I saw many mouths with sets of teeth adapted to fit the palate and cover these decaying roots;

I recall the case of a refined and cultivated lady coming to me to have a superior partial denture removed and refitted. It was fastened to the palate so tightly by clinging to the natural teeth that it required several minutes to remove it, the lady remarking that she had worn it for nearly one and a half years without removal, by advice of the dentist who made it; obviously it was placed in the mouth to remain forever, or till repair either of the mouth or plate was required; but she, unassisted, could not have removed it had she so desired.

I will leave undescribed the condition of her mouth and the state of the plate.

Having cleansed the latter and put it into condition for easy removal, and giving the patient some plain advice regarding cleanliness, etc., she departed, most heartily thanking me for my "great kindness." On another occasion a lady was having a superior full denture fitted over the roots of all the sixteen teeth, though they had all been ground to the gums and their canals cleansed and filled, these are ladies of refinement and wealth.

Very few gum sections are used, plain single teeth being preferable, and in most instances there is no gum about the ten anterior teeth. Gold plates, superior and inferior, are usually held in place by a pair of U-shaped gold springs, their free ends being attached on either side by pivots to upper and lower.

In all cases where extraction of roots or teeth was advised, patients were favorably disposed, gas being used in most instances, rarely extracting without an anæsthetic, never giving ether or chloroform, for the laws preclude all dentists from administering these agents; the family physician must be present.

Operations such as the preparation of cavities for fillings were performed in the usual manner with no more trouble than in my own practice.

Many of the operations required the soft fillings rather than gold, for the reason that caries had so far advanced that the weakness of the tooth admitted of no other material.

The fees in a first-class practice average about the same as with us, except that an English dentist charges for every detail, of whatever name or nature, and in this respect is remunerated more liberally than the American.

Another generation will have passed before the English patient will become educated to the requirements of the American standard of excellence. The English prefer an American dentist to any other, their own countrymen, even, not excepted.

All appointments were made by the servant, who entered the name and address in a book kept in the hall for this purpose. A person wishing an appointment examines the book, and seeing what hours are open on the day desired, selects the time most convenient, and has his name and address written on the line indicated. The operator does not meet the patient till fulfilling the engagement. Another feature of this establishment is a white slate which was every morning placed conspicuously in the operating-room, having written in pencil thereon the hour of appointment and the name of patient. One pleasant feature in an English practice is the custom with patients of all classes, on taking their departure from the operating-room, to invariably shake hands with and thank the operator for the services rendered and the kindness shown, notwithstanding he may have inflicted severe pain in the performance of his duties.

OBSERVATIONS ON DENTAL CARIES.

BY DR A. M. ROSS, SPRINGFIELD, MASS.

THE practical man is never satisfied with any theory that cannot be reconciled with all the facts that are known in relation to the subject, and he is disposed to at least a kindly criticism of a still prevalent custom of ignoring facts not compatible with a theory, or the twisting of other facts to conform to it.

Dr. Thomas Fillebrown has proclaimed a broad truth in saying recently that a bushel of disease germs disposed on healthy tissue can produce no ill effect. He means, of course, where the resistive power is sufficient to inhibit them or digest them. They must have suitable soil for development, and that varies in different cases. Seed-corn from the same ear may bear a far better fruitage in one garden than in another. Self-evident similes would be useless with the difference that exists between pathogenic and saprophytic microbes, if it were not that animal and vegetable organisms are subjected to the effects of both, and that there is as much difference between them as there is between the thieves and gamblers of a community and the honest scavengers at work in our streets and alley-ways. Careful study of the subject of dental caries proves beyond a doubt that the disintegration of the structure is caused by organisms. But that they are the prime cause of caries is far from proven.

The waste product of these organisms is not destructive in some cases. The "miniature acid factory" is often quite well established in teeth, and a return of vigorous resistive power puts a stop to operations, and it doesn't matter whether this arresting of caries is permanent or not, the fact itself disproves a theory of waste products that alone are sufficient to destroy the tooth. But the fact is, it is often a permanent arresting of decay. There is a curious fact in connection with this subject that I do not remember having seen mentioned by Dr. Miller or others. It is found that the slower or the nearer to an arrested state of decay the nearer to the initial point of breaking down of the lime-salts are the micro-organisms. And that in rapid colorless caries and in senile decay the field beyond the closest approach of the organisms is very large in which not a single canaliculus is distended. Possibly the reverse of this would be more compatible with a theory of waste-products. I leave it for those better qualified than myself to say.

If we read aright the conclusions of bacteriologists we find that the conditions favorable to the saprophytes are not dependent upon external conditions. Either death of the tissue or its lack of resistive force—very nearly an equivalent—is necessary for the development of micro-organisms, etc. The highest expression of vitality is sufficient to prevent or to arrest existing caries of the teeth. Another question presents itself that arises from two important considerations,—the first, it may be said, is based on the fact that the word stasis has no application in life, and the other consideration has its basis upon a certain microscopical fact. Movement is everywhere. In all systems of life it is a gradient or retrogradient continually. We cannot except any part of a system to this law. Ground sections of carious teeth treated with one-eighth per cent. good chloride show the primary changes in the dentine to be beyond the point of softening at all.

The question that arises, then, is this: Is the degree of non-resistance a negative state in living teeth, or is it one of irritability, denoting a retrograde movement that of itself is destructive of tissue? If we take long broad views of the subject our ideas regarding these micro-organisms may change as we see the necessity of them in the economy of nature. We may discover that dental caries is the result of impaired resistive forces, or more properly impaired vitality. Millions of these very organisms constantly present in the mouth, notwithstanding the utmost care taken of it, force us to believe that their inhibition by artificial means can have only temporary effects: the destructive waste-products can

be successfully met alone by a continuous antagonism from an adequate energy.

We have found that combinations of gold and tin, gold and amalgam, etc., have had a more preserving effect in some cases than any of the metals or alloys used singly. In some other cases it has made little or no difference. Are we justified in concluding that the favorable results are due to a destruction of acid-producers about the teeth, or, perhaps more reasonably, to conclude from all the evidence that by such combinations of material resistive forces are stimulated to greater activity?

TINCTURE OF CHLORIDE OF IRON.¹

BY THOMAS J. GIBLIN, D.M.D.

THE subject of my paper was suggested by the condition of the teeth so frequently noticed in our patients after the continued use of the tincture of chloride of iron as a medicine.

You will all, doubtless, recall having brought the teeth of a patient into proper condition by the careful use of the wonderful means of restoration at your command, and to have seen, after a comparatively short period of time, the same patient return and, to your surprise, exhibit in his teeth the ravages of decay. Upon inquiry, you learn that the patient, acting upon the advice of some physician, has been using the tincture of chloride of iron. The patient will usually inform you that he has taken for some time, through a tube, a solution of tincture of iron in water. This experience has been mine so frequently, of late, that I have judged the question of the cause of this trouble of sufficient importance to discuss it in my paper to-night, and in it rather to suggest an investigation than to propose a remedy.

What is the agent of which my paper treats? I will recall to your minds some facts concerning it. It is a mixture of alcohol and the solution of the chloride of iron, which has been made by pouring dilute hydrochloric acid upon a quantity of fine iron wire cut into small pieces, allowing it to stand during effervescence, after which it is boiled and filtered. To the filtered liquid is added hydro-

¹ Read before the Harvard Odontological Society, Thursday evening, March 26, 1891.

chloric acid. This mixture is poured slowly into nitric acid. After effervescence ceases, heat is applied until the disappearance of the nitrous odor. Dilute hydrochloric acid is added to make the whole equal 100.

The properties of the tincture of chloride of iron are thus described: It is a bright-brownish liquid of a slightly ethereal odor, a very astringent, styptic taste, and an acid reaction. It is decomposed by the alkalies, alkaline earths, and their carbonates, astringent vegetable infusions and mucilage of gum arabic. It is one of the most active and certain preparations of iron, and is much employed as a tonic. Its purpose is to supply the necessary integral portion of the red blood-corpuscles.

This is the preparation of whose effect, as witnessed in the dental chair, I desire to treat. That this tincture, in solution, does exert such deleterious effect upon the teeth is probably agreed to by all practising dentists. If there be an exception, he can be readily convinced by a simple experiment. Let him leave a tooth in a solution of one drachm of tincture of chloride of iron and one ounce of water for twenty-four hours. He will find the enamel softened and easily scraped.

Having admitted such an effect, what should be our course as dentists? There is a class of medical practitioners who especially endeavor to make little of dental medicine, and who usually think that the end justifies the means. Such will be satisfied to know that by the use of the tincture of chloride of iron they have supplied to the blood that element which will increase the activity of its functions, even though the result be disastrous to another important organ of the body. We should each call to the attention of the physicians of our acquaintance the clinical experiences we have had with the uses of this drug. It is not for us, as dentists, to tell them what medicine they shall use, or how they should prescribe it, but if they come into our field with their results we surely are privileged to criticise the means which produce such evils to the teeth.

We have a precedent in our own society to warrant this course. At our last meeting a prominent and scientific member of the medical profession called our attention to the possibility of our work producing results that might demand his care. Here we have the certain damage done by their medicine, which requires our work to repair. We appreciate and cordially receive his advice; I am sure we were all influenced by it. Why should not our words be equally well received? I feel sure they would, and that

our medical friends would endeavor to prevent such action of this drug as we complain of.

That this is probable is shown by the experience of the past. When the effect of this medicine upon the teeth was formerly called to their attention, they prescribed it to be dissolved in water, and the solution to be taken through a tube. They believed that the injury was done by the free acid in the tincture, and that the solution in water would weaken its action, and, still further, that the use of a tube would prevent it altogether. These physicians were honest in their course, but mistaken. It is easily shown that water especially increases the destructive power of the tincture of iron on the lime salts of the teeth. If water be added to a neutral solution of the chloride of iron, it will decompose it, giving basic salts of iron and free hydrochloric acid. Certainly water is worse than useless in connection with the tincture of iron. When a strong solution of this tincture is used, it first forms a dense and hard oxide of iron, which closely adheres to the surface of the tooth, and serves it as a coat of mail, protecting it from the action of the free acid. The oxide formed in the water solution is very different in its nature, being flocculent and non-protecting to the teeth. As for the use of tubes, I believe that they have been shown to afford very little defence, perhaps because of almost universal carelessness or ignorance in their use.

I have said that I would not suggest a remedy, because I believe it not to be within the bounds of our professional field. We are not expected to trace, through all the organs of the body, the probable action and effect of any method of administering this drug or any other. If we suggest an investigation of the cause of evil results, we have fulfilled our duty, and have gone as far as professional etiquette permits, unless we are invited to give a further opinion. Our duty, in a humanitarian spirit, is to prevent the occurrence of decay in the teeth of our patients, as well as to repair the damage done.

We are, as a profession, justly proud of the progress we have made towards the consummation of our hopes of inhibiting bacteria, the exciting cause of decay.

I offer my paper to-night, trusting that some attention may be drawn to what I will term a secondary cause of decay.

THE RELATIONS AND RESOURCES OF OUR SPECIALTY.¹

BY HORATIO C. MERIAM, D.M.D., SALEM, MASS.

To the Greeks, *Physic* meant Nature, and *Physician* Naturalist. These definitions are not without value to us now, when in the evolution or growth of our specialty there seems to be developing a class of practitioners who, basing their practice on a study of nature, her laws and forms, work for their preservation and restoration, thus enlarging the scope and range of our specialty, so that where we formerly heard of a fine operator, we now hear of a good adviser, and in place of resting reputation on a fine filling or a "good job," we say that such a space was well treated, the arch well preserved, or that the mouth showed good care. Thus we have practitioners who draw their theories from nature, leaving behind that other class of practitioners who draw their patients to suit their theories.

Nor are the former less free because free within nature's limits. For the acceptance of her as a guide and teacher implies that, in order to follow this guidance and teaching, they are to be free from many of the restraints that hamper and limit commercial pursuits. The professional man thus following and working can say, in the language of the Epistle to the Phillippians, "Not as though I had already attained, either were already perfect: but I follow after, if that I may apprehend that for which also I am apprehended. . . ."

There goes with this, of course, freedom to follow, that Truth may be found and shown to other men, and as it is freedom to serve in a cause that is greater than self, of such a professional spirit it may be said,—

"How haply is he born or taught
Who serveth not another's will;
Whose armor is his honest thought,
And simple truth his utmost skill."

This would seem to meet an objection that I have met among those who have not studied ethics,—i.e., "*our acts, their motives and tendencies*," as they have been studied in this Society. It was said to me, "You do not allow your patients to dictate to you, and why should you expect to dictate to those who supply you?" "On the contrary," I replied, "every patient dictates to us. Every patient comes to us with certain conditions of the mouth, the teeth, or the

¹ Read before the New York Odontological Society, June 16, 1891.

functions of which they form a part, that dictate to us, and our reputations are made by the clearness with which we read those conditions and the ability with which we bring the resources of our specialty to meet them." They thus must needs have all the resources of nature and of art as an armamentarium placed at their disposal, who are to defend the temple whose builder and maker is God. Thus the physician or "naturalist" called to treat the eye, the ear, the teeth, the crooked limb, or the weary brain, accepts the dictation of their condition, and in accepting secures the right to dictate how the disease or deformity shall be met.

It may be some Bigelow consulted regarding the hip or stone in the bladder, some Bowditch regarding the lungs, but whosoever the man or whatever the disease, all the claims of humanity assert his right and his liberty to prescribe to meet disease as he finds it. Shall this workman lose his right hand? Still the surgeon's prescription, though it is to be done by the hand. Shall this patient leave home and family and live in another climate? still a prescription. Shall this arch be enlarged or reduced? This foot twisted or cut? Whatever the case, whatever the remedy or treatment indicated,

". . . the odors of myrtle or pine,
Breeze of the prairie or breath of the sea,"

it still remains a prescription.

So we should assert that with us rests the right of prescribing for our patients' needs, and the dictation, or direction, if you like it better, as to how those needs shall be met.

We know that every thought or action represents destruction. The sermon of the ecclesiastic, the song of the poet, the sigh of the lover, the cheer of the patriot, all represent the destruction of a certain number of cells, whose destruction has set force free. Even holding the faith that saves or the doubts that distress calls for a physical system that must be continually undergoing destruction and repair, and as growth or action is founded on the destruction of previous growth, new cells being constantly produced to replace those used, we have "the sum of all action,—life."

A specialty having care of a great and important function, one which is so essentially connected in supplying the needs of all other functions that make a complete life, must have a growth as great as the needs to which it ministers, and resources as great to meet those needs.

We have heard the claim that "our specialty owes all it is to its instrument-makers, and that they have only to cease making for a time to insure our destruction," and the other claim that "they own so many patents that they can take three millions a year from our specialty where they take one now." Still, as there was much in the world before we came, and, strange to say, much will be left in it after we leave, I am inclined to think that they take themselves a little too seriously and that the great and terrible day of an instrument-maker's wrath will not come to us this year. We have but to open our eyes to the great resources around us, and connect our specialty more intimately with them.

"You remember how, when the city was besieged, each artisan who was called upon in council to suggest the best means of defence recommended the articles he dealt in: the carpenter, wood; the blacksmith, iron; the mason, brick; until it came to be a puzzle to know which to adopt. Then the shoemaker said, 'Hang your walls with new boots.'"

Now, all these things are needed in the defence of the city, though perhaps not quite in the way that the dealers proposed; the wood, the iron, the bricks, the boots, would all be of service, but there was needed some one to prescribe for each its fitting place.

We may perhaps feel that the English makers in consenting to advance the price of teeth in England lost all claim to special sympathy; nevertheless, we resent as an interference any attempt to exclude from American practice anything required by us in meeting the needs of our patients.

We should give our workmen all the credit due, payment and praise also, but not the power to dictate regarding what shall be used in our practice. Praise when they do that which is right and make that which is good, but make clear also that they are to make that which we think is good for the needs of our patients, and for the development of our specialty.

They might build works as great as the Pyramids of Egypt, and build them well, but if they were not what we wished to prescribe, or to use in making our prescriptions, they would be of interest only as monuments of power or bigness.

"If they be not big for me,
What care I how big they be?"

There will, of course, be a great difference in the development and position of those practitioners for whom makers make that

which they wish to use, and the other class of practitioners who are obliged to use those things that makers wish to make.

Perhaps *development* should have been included in the title of this address, for the effect of controlling our relations and resources will have much to do with the development of our specialty.

We need the increased skill of the hand, secured by creating what the brain has conceived; and as the hand and brain are developed by reciprocal action, we get increased brain-power with increasing skill of the hand.

The business of the busy practitioner is not to invent new resources or instruments for their own sake, but to adapt resources to patients.

Some of the finest development in our specialty is seen in connection with the ability to use the old, but there are some whose development we should have greatly missed had they not worked out their conceptions, and given them to us in forms of beauty and marvellous adaptability.

Just as the same blood builds and nourishes the foot that walks and the brain that thinks, so we do not feel that anything can be held as not included in medicine because mechanical or of use in other ways.

"Pressure produces absorption" is a law alike in orthopedics and in orthodontia. Should a physician refuse to use nitre because it is also used in the arts, in gunpowder, and in agriculture as a fertilizer? We cannot feel that anything that can affect our specialty in any way is not to be studied in connection with it, or can be rightly studied as isolated from "nature," "medical science," or "the healing art," but by keeping clear to ourselves and our students that our work is a part of a system for the making the best of our race. We connect it with interests as great and far-reaching as any of the problems of life. "Is there anything better in a State," says Plato, "than that women and men be rendered the very best?" Violators of nature can never be held in high esteem. It is quoted from Shakespeare, that, "One said a tooth-drawer was a kind of unconscionable trade, because his trade was nothing else but to take away those things whereby every man gets his living."

I beg to quote somewhat at length from Dr. Holmes's "Medical Essays," this broad definition and description of medicine.

"Medicine, sometimes impertinently, often ignorantly, often carelessly called 'allopathy,' appropriates everything, from every source, that can be of the slightest use to anybody who is ailing in

any way, or like to be ailing from any cause. It learned from a monk how to use antimony, from a Jesuit how to cure agues, from a friar how to cut for stone, from a soldier how to treat gout, from a sailor how to keep off scurvy, from a postmaster how to sound the Eustachian tube, from a dairy-maid how to prevent small-pox, and from an old market-woman how to catch the itch-insect. It borrowed acupuncture and the moxa from the Japanese heathen, and was taught the use of lobelia by the American savage. It stands ready to-day to accept anything from any theorist, from any empiric, who can make out a good case for his discovery or his remedy. 'Science' is one of its benefactors, but only one out of many. Ask the wisest practising physician you know what branches of science help him habitually, and what amount of knowledge relating to each branch he requires for his professional duties? He will tell you that scientific training has a value independent of all the special knowledge acquired. He will tell you that many facts are explained by studying them in the wider range of related facts to which they belong. He will gratefully recognize that the anatomist has furnished him with indispensable data, that the physiologist has sometimes put him on the track of new modes of treatment, that the chemist has isolated the active principles of his medicines, has taught him how to combine them, has from time to time offered him new remedial agencies, and so of others of his allies."

Our specialty can assert that we have a claim on all people that have the best at heart; that just as it is the duty of the good citizen to be interested in government, churches, schools, science, the administration of justice, and maintaining the public health, it is likewise their duty to see that our specialty is unhampered, that we are not isolated, but make a part of a great system that helps men and women to be and to do their best.

Life has become so complex and interwoven that the competent man has much put on him to do, and, like the locomotive, must be kept in the best order possible to do it. Still comfort breeds forgetfulness; but the members of a community do not discharge all their obligation to our specialty in paying the bill of their own dental attendant.

Our schools should not be isolated, but become known as correlated with educational institutions. A wise course has in the past few years been adopted by the Harvard Dental School of making more of her position as part of the University, and thus securing the attention to the work she is doing for the good of the com-

munity, and, as the world always helps those that she can see are helping others, the fund for the school's endowment has grown more since this policy was adopted than in all the previous years.

The advantage to be gained by having our schools advertised in educational journals, especially in that we thus reach teachers, should not be overlooked; for many bright men often teach before selecting a profession, and we shall also extend the relations of our specialty.

Let us as far as possible cease to be exclusive, learn to be liberal and connected as we can be with the world around us. It was not pleasant some years ago, on going into a shop that supplies materials and apparatus to the Institute of Technology, the medical schools, and other educational institutions, to find that they did not know of the dental schools.

It is a good rule to trade with those who can consult you in return, and, being known to all makers and dealers in articles we can use, we shall secure wider relations for our specialty and increased employment for ourselves.

During my service in the Massachusetts Dental Society, I found that had I been practising in Boston my acquaintance and practice would have been increased by the wider contact gained in helping secure exhibitors, and we should all gain by scattering our purchases where they would do us the most good. Every dental school can secure a directory of all who can make or deal in any of our resources, not only for the economy in purchasing, but for the increased contact with the world and the increased influence for them and their students that they will gain.

The same course should be pursued in seeking advertisements for our journals. Many of the dealers in small tools and various articles we use, sell, I have been informed, many thousands' worth in a year, that come to us through the "depots." And by securing advertisements of such dealers we shall gain increased influence and profit for our journals.

One of the disadvantages of the combination and its control of journals seems to be, that in order to prevent competition, by limiting the number of those who can engage in dealing in our resources, it must strive to prevent a knowledge of their source and relations.

In addition to my dental journals I take the *Druggists' Circular*, 72 William Street, New York City, which, besides giving many valuable articles on medicines and chemistry, usually has a number of

pages giving the composition and directions for making many preparations, both professional and proprietary.

Its advertising pages represent a wide constituency, too numerous to mention here, but which if followed will show much of value to us in *materia medica*. The criticisms of chemists and pharmacists on antiseptics are of special value, but the study of our relations and resources will lead us into many fields.

Thus wheels, brushes, buffing-felt, etc., belong with polishing supplies. I heard of one firm in a neighboring city, which in 1890 cut over one million two hundred thousand yards of cloth into buffing-wheels. The Chicago Watch-Tool Company, of Chicago, the Faneuil Watch-Tool Company, of Boston, the American Watch-Tool Company, of Springfield, Mass., and many others make polishing wheels and lathes. Bottles, lamps, tooth-powder boxes, and the like can be found at the dealers in druggists' glassware and sundries. Whitall, Tatum & Co., Philadelphia, New York, and Boston, have an excellent catalogue of them.

All arrangements for working metals—blow-pipes, furnaces, crucibles—belong with assayers and chemical apparatus. Eimer & Amend, Third Avenue, New York, have a good catalogue of these.

Furnaces are made by the American Gas-Furnace Company, Nassau Street, New York, and their advertisement should be secured, as well as that of the cabinet-makers who made the valuable instrument-cases for Dr. C. F. Ives and Dr. J. Morgan Howe.

Enamel fillings I suppose to be founded on the enamels and colors used by jewellers and in decorating china. A. Sartorius & Co., 28 Barclay Street, New York, give a long list of these.

Forceps, lances, scissors, probes, syringes, and all instruments for oral surgery can be had of dealers in surgical instruments. Tieman & Co., 107 Park Row, New York, publish a large catalogue.

Files, broaches, chucks, steel for matrices, lathes, polishers' supplies, can be had at the dealers in fine tools. Frasse & Co., Park Row, formerly 62 Chatham Street, New York, issue a fine catalogue of them, and so do Montgomery & Co., Fulton Street, New York. A list of all the makers and importers of tooth-brushes, etc., will be of value.

For many years I have had nearly all my instruments made for me. I like a small shop where I can get near my workman. A list of all in New York would be of value. A similar list of the workmen of Philadelphia would add much to the interest of the advertising pages of our journals.

The chemist and assayers have much of interest to us now, but

much more can be done by interesting them in our filling-materials and metals. We have united on a series of college text-books, why not unite on a series of college filling-materials? What better work can be done by a society than to take up and bring this matter to the attention of leading chemists and pharmacists?

The makers of fine soaps can also be asked to advertise in our journals, and so can dealers in wax and the gums that enter into modelling compounds. Thus even asbestos and charcoal, crocus and pumice, polishing compositions and whiting, can all be made to contribute to our journals, as we must constantly pay tribute for them.

The names of the chemists who analyze tooth-substances can be put in the list, together with the artists who can make cartoons to illustrate our papers. As hospitals have their formulæ, so every dental school can have its formulæ for gold-plate solders, tooth-bodies, etc. We should not be quite so apt to go to the extreme in advocacy of any one thing, like copper amalgam, if we had a wider discussion of metals. I have never used it, because I heard nothing said in its favor that convinced me that it was as good for a soft, poor tooth as what I had done for years. When called to treat a tooth so poor as to need its tubuli filled, I cauterize with nitrate of silver, and afterwards introduce my amalgam.

In schools at a distance from manufacturing centres, a room could be properly given a workman who was trained to make and repair instruments, regulating appliances, etc. The early years of practice with young men will be made much easier, and their value as assistants increased, if they are trained in the making of appliances.

"Every man to his trade" was an old motto. Every man to his part of a trade is the danger of to-day.

The manufacturing desire to control and the need and benefit of that system is so great in many ways that in some of the watch-factories workmen are employed who can only make one part of a watch, and who may be ignorant of the work done in the next room.

We hear of the "rights of capital," the "rights of labor;" let us hear now of the "rights of occupation,"—the right to learn a trade, the right to engage in business. The Crispins were not given a charter in Massachusetts because they proposed to limit the number of apprentices to be taken. We have not heard that any combination which has the effect to limit the number of persons that can engage in an occupation has obtained a charter there.

The schools for teaching trades have come into being since this exclusive spirit has developed among workmen, exclusive action being met by liberal action.

The time has perhaps not yet come for teaching the making of our instruments as a trade, but some kindred trades could be united in a course at industrial schools. Mould-making for teeth, and die-sinking, surgical instruments and appliances, oral, dental, general, and electrical, would send out men who would not fail of employment, perhaps in some small shop as owner, or often in some school or hospital in any part of the world. Teaching the making of our materials in the schools of pharmacy is also one of the possibilities of the future regarding our resources, and also one of the means for broadening our relations and development.

Dr. Bonwill makes a valuable suggestion,—viz., to cultivate the capacity to improve, that shows itself among students, so that in the greater variety that would result we should have greater freedom from the combination, the Tooth-Crown Company, etc. I am not able to quote his own language, but I think the above is the substance. A list of the various workmen who can do the work required or have done similar work should be kept to make the suggestion practical.

Dealers naturally wish to narrow the channels of trade; we must, in growing, broaden them. They will not keep things for which there is no demand, they may not wish a demand for things they do not wish to keep.

By reporting the names of small makers who serve us well, we would relieve much of the tension.

If those who are interested in alloys will give us a paper on them and publish the name of an assayer or other competent person who has been instructed by them, a channel of information and supply will be opened that will be of value.

Work like this indicated need not be confined to America, but wherever our speciality has a foothold it will ultimately be needed.

The names of firms given are intended merely to indicate some of the lines that can be followed, and because their catalogues can be had by those interested. The same lines can be followed in other parts of the country and much help of influence and value secured. But the activity of professional life is an essential element and sum of all action and will show itself in many ways. To some it may be given to work on committees, to some to edit, to some to improve instruments, to some to study cements, to some to work with the microscope, to some to investigate medicines, to

some to encourage and aid, as they can, those who are doing any work for us, but all should be done as for our specialty to aid its development, while it aids to make the perfect man that is to be. It is not for us to say what form professional spirit shall take, or in what work it shall manifest itself, for like love it will go where it is sent by the angels of our nature; but it is for us to make as far as we can the crooked places straight, and the rough ways smooth, that it may enter and dwell in our specialty, that light may not go out from among us and leave our souls in darkness. Are there those who think these questions too small for discussion?

“There is no great and no small
But the soul that maketh all.”

Reports of Society Meetings.

AMERICAN MEDICAL ASSOCIATION.

Wednesday, May 6, 1891.—Morning Session.

SECTION OF ORAL AND DENTAL SURGERY.

(Continued from page 574.)

Dr. Talbot.—We will now hear Dr. Andrews's paper on "Growth of the Cementum."

(For Dr. Andrews's paper, see page 587.)

Dr. Marshall.—Mr. President, as I feel I shall be obliged to absent myself, I want to make a report from the nominating committee: for Chairman of the Section, Dr. Taft, of Cincinnati, and for Secretary, Dr. E. S. Talbot, of Chicago.

Dr. Taft.—I would rather that some one else would accept; I do not absolutely decline, but think some one else can hold the position better.

Referred back to the committee to report later.

Dr. Talbot.—We will now proceed with the discussion of Dr. Andrews's paper.

Dr. Taft.—I want to make a remark in reference to this matter. Dr. Andrews referred to what is ordinarily denominated interglobular spaces and gives the location as between the enamel and dentine.

Dr. Andrews.—Not between the enamel and dentine, just within the dentine.

Dr. Taft.—I know; I understood you to say this position has been taken by others, that they located the interglobular spaces in the granular layer; but that is not the location nor the appearance as originally described by Czermack, as recorded by Kölliker. If the structure denominated interglobular spaces is to be found in the granular layer, then what is this globular structure within the dentine?

Dr. Andrews.—The one is like the other, with this difference, the calcified globules near the cementum are small, while in the dentine of the crown they are much larger.

Dr. Taft.—We have not ordinarily applied the term interglobular space to this layer between the enamel and dentine. In some instances there is a very large mass of it of considerable thickness. Another peculiarity of that layer is, it seems to consist, whether thick or thin, of mere little globular granules. In some instances there seems to be tubuli, or something of the kind, extending through it to a very considerable extent. I wish I knew more about that than I do, and about the interglobular spaces.

Dr. Andrews.—Interglobular spaces are found with the globules in layers, the layers of formation, some near the enamel, others near the pulp. In the teeth of some fishes the whole matrix is globular. In the human tooth it is an evidence of lack of nourishment while the tooth is forming. The globules do not fuse, they are arrested and calcified as globules, not forming a perfect layer of matrix. The material between the globules is not calcified substance. Some teeth have very little, others no evidence of a granular layer, so called, others have a good deal. Some have hardly a trace of what we call interglobular spaces, in the dentine of the crown, others will have a large amount. It is an arrest in the developmental process in the formation of the tooth while it is forming a layer of matrix. For some reason the globules have become calcified while in the globular form, before they fused together. The tissue of the interglobular space is not fully calcified, while the globules always are.

Dr. Allan.—This theory of Dr. Andrews, in which I believe he does not stand alone, is one that I think we should place in the status that the old Scotch law allowed: when a person was tried and was neither innocent nor guilty, it was "not proven." The three structures of which the two substances are composed—enamel, dentine, and cementum—are as diverse in their character and structure as any three tissues well can be. According to this theory of Dr. Andrews, all three of these substances, materials, or tissues—that is, the matrix of them—have a like developmental basis.

Dr. Andrews.—The lime base of the matrix material, the basis substance, is the same in all. It is the calcified tissue.

Dr. Allan.—All three are formed from cells, which have special duties required of them. Enamel is only two to four per cent. animal basis, ninety-six to ninety-eight per cent. mineral. Dentine again is thirty to forty per cent. animal, the balance mineral. I have examined a great many of these specimens of Dr. Andrews's, and I have endeavored to see exactly as he sees, and I think I do

see what he sees; but I don't interpret it as he does, for this reason: The material, whatever it is, the calcoglobulin, is thrown out in the shape of little globules, which vary greatly in size and character. The position may or may not be a vital condition. All these preparations of Dr. Andrews were made with the greatest care and from sections as little changed in preparation as possible. The calcification was produced by a very weak solution of acid, and every care taken to change the tissue as little as possible; but—and I hope I may be excused in saying so—it is not proven that these are not post-mortem appearances; and a long series of experiments will have to be carried on to prove whether they are post-mortem or living appearances. You do have unmistakable indications of these globular layers; and they are beautifully shown in these preparations. These appearances are not constant; now you see them, and again you don't.

Dr. Andrews.—I have been speaking in all of the matrix substances, not its animal base: that is another matter. The globules are always present in my specimens.

Dr. Allan.—But the main point I wish to show is that I do not see why this cannot be in a measure post-mortem appearance. I do not see why the fluids that have been used in preparing the tissue, glycerin, in which they are mounted, may not have some cause in giving them their characteristic appearance. It is a most interesting point. Whether the two kinds of cells that go to make up the formation of dentine really exist or do not exist, one the fibre-forming and the other the matrix-forming. We often see appearances that would indicate double or dual nature of the cells that form dentine. In enamel it is not so. We do not often treat and we seldom see a dual character of cells. To be sure, the enamel is so totally different that the one form could be dispensed with; but in the cementum again it could not be. There we have a large mass of animal matter, and we have a composite structure.

Now, so far as these interglobular spaces are concerned, Dr. Andrews's specimens were taken under high power. The interglobular spaces in dentine are vastly different in size from those interglobular spaces that Dr. Andrews threw on the screen. Take a tooth and make a section of it, and you will find interglobular spaces sometimes; I should say they would extend across nearly one-tenth of the thickness of the tooth. These globules are much smaller than the average size of the interglobular spaces you find in dentine.

Now, I am not saying that this theory is not true. I believe

that the evidence Dr. Andrews offers is very strong and confirmatory evidence. I only say there are still some points open for investigation before we can say proven and adopted. I don't know of any one in the profession who deserves greater respect than does Dr. Andrews, or who has done more disinterested work; and the results have been certainly most gratifying. I can say this heartily and truthfully; and I know of no one who has given his specimens more freely and generally to others for the purpose of examining them.

Dr. Taft.—I wish more attention were given to the discrimination of these two conditions. The large spaces within the dentine that are ordinarily denominated globular spaces are very different in size from any condition that is found in the granular layer. In the granular layer these little spheres are granulous and thoroughly calcified. This peculiar abnormal structure in dentine, marked by these lines in a greater or less degree, is defective; and then these circles or segments of circles within dentine are not in a normal condition: occasionally you find deep lines running through, and in some of them no organization of that kind at all.

The globules are thoroughly calcified. The interglobular space is not perfect, but the globular spaces are perfect. The tissue between the globules is not calcified, but the space between the globules is soft. I assume this matter is clear to Dr. Andrews, but I wanted him to make it clear to me and to all of us.

Dr. Andrews.—If you will examine sections of teeth where there are interglobular spaces, you will find the globules are calcified. In dried sections, the spaces between the globules will show dark under the microscope in the same way that the tubes do. It is because the spaces are not calcified, and when dry they fill with air. Some of the globules are only slightly attached to the matrix, while others show only a portion of their contour.

Dr. Allan.—Do I understand you to say that this is a secretion?

Dr. Andrews.—It is supposed that the lime in the form of minute calcospherites comes from the blood. These pass through the cells, and are seen to be merging together forming large globules, or mulberry-shaped masses, and these fusing form the perfect layer of matrix, if there is no arrest of development while they are in this stage.

Dr. Taft.—You make the point, it was arrested in development?

Dr. Andrews.—Yes, when interglobular spaces are found.

Dr. Taft.—You mean that the environments are not perfect?

Dr. Andrews.—Yes, sir.

The President called on Dr. Grady to read his paper on "The Use and Abuse of Dental Charity."

(For Dr. Grady's paper, see page 592.)

The paper was discussed by Dr. Taft, of Cincinnati, Dr. Clara McNaughten, of Washington, Dr. J. L. Williams and Dr. R. R. Andrews, of Boston, and Dr. E. S. Talbot, of Chicago, after which the following resolution was unanimously adopted:

Resolved, That this section would suggest to the National Association of Dental Faculties the importance of some action towards correcting the abuses of the charities of infirmaries of dental schools.

(To be continued.)

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular monthly meeting of the American Academy of Dental Science was held in the Boston Medical Library Association rooms on May 6, 1891, President Seabury in the chair.

The paper for the evening was read by A. K. Stone, M.D. Subject, "Dental Responsibility for Early Diagnosis of Tumors of the Mouth and Jaws."

(For Dr. Stone's paper, see p. 602.)

DISCUSSION.

Dr. Fillebrown.—Mr. President, I desire to thank Dr. Stone for the very intelligent, instructive, and exhaustive paper which he has favored us with. I feel consoled by what the doctor says about the paucity of cases which present themselves. Such cases have always been of interest to me; in a sense I have been looking out for them. I thought that perhaps I had found many less than I ought to have found. It seems, however, that I have at least had my share. To add to the interest of this occasion, I have selected three cases and will present them for your consideration to-night.

CASE I.—Miss —, aged thirty-five. Odontocèle in left superior cuspid region. The patient was brought to me by her father, a physician, who had extracted her upper teeth preparatory to a set of artificial teeth. Tumefaction of the left side remained, and in regard to these conditions he desired my advice.

Upon examination with a steel probe I felt what was evidently

enamel deeply embedded in the tissues. An operation revealed a fully-developed cuspid tooth lying almost horizontally in the jaw, the crown pointing forward. The removal of the tooth was followed by immediate recovery, and the mouth was soon in perfect condition for a plate.

Such a case must come to very many of us, and the only peculiarity about it was that it showed the value of special judgment as perfected by special practice. The gentleman who brought the patient (and she was his daughter) was a man of large medical knowledge and of considerable surgical ability, and yet he combated my position very strongly and would not admit even to the very last that there was a tooth in the mouth. He was sure that they had all been removed.

I remember another case which illustrates a tumor of the crackling egg-shell quality as described by Dr. Stone. I never quite understood the cause of it. The patient was a young man, and the only abnormal appearance about his mouth was the fact that the six upper teeth, involving the region from one cuspid to another, were a good deal crowded. There was considerable tumefaction there, and upon pressure over the tumor a crackling sound could be heard and a crackling sensation felt. The tumor would yield to pressure, and upon removal of the finger a depression remained for a time, but the original shape was regained. The patient's teeth were so crowded and irregular that he desired them out, and as this seemed best in his condition, I removed them. There was no discharge from the tumor and nothing unusual occurred. The tumor got well in a short time after the removal of the teeth. Whether the crowded teeth could have caused that condition, I do not know. A probe passed up through the socket of one of the extracted central incisors showed quite a large cavity which remained open for a good while, but finally was completely cured without further treatment. As soon as advisable the patient had artificial teeth, and as far as I know has had no further treatment.

CASE II.—Mrs. —, aged forty-five. Epulis arising from the pericementum of the left inferior second bicuspid mesial surface. Cured without operation.

This tumor had existed for some time, and when my advice was asked it filled the space between the bicuspids and protruded considerably into the mouth. Applications at various times had failed to destroy it or much restrict its growth. The patient was very nervous, and would not consent to anæsthesia or to any operation without it. I concluded to try constant pressure with

styptics. I selected the persulphate of iron, and taking a pellet of cotton of suitable size to fill the space between the teeth, I coated it with the powder and packed it down upon the tumor. This was repeated at intervals of one or two days for about two weeks, the cotton being packed directly upon the tumor. The bulk of the growth disappeared upon the second application. Then, by following carefully to the starting-point of the tumor, I succeeded in effecting a complete cure in the two weeks, and without any operation involving the cutting of soft tissues or removal of bone.

CASE III.—Mr. —, aged thirty-five. Tumor of upper jaw with suppuration. In February, 1889, this patient came to the Harvard Dental Hospital, accompanied by his physician. He showed himself to be intellectually bright and capable. His stature was diminutive, he being less than four and one-half feet tall. The upper frontal portion of his skull was well developed, but the superciliary ridge was very receding, not projecting at all beyond his eyelids, and the whole surface of the skull was very irregular.

The calcareous elements were quite largely in excess in his bones, in consequence of which his limbs had been broken some six times by slight causes. His muscular system was very well developed. His upper jaw was very small, much smaller in proportion than the under, the latter being quite prominent. This patient showed an extremely long, soft palate, the uvula and opening to the posterior nares being quite as low as the normal position of the glottis. On the whole, his mouth exhibited a unique appearance. His upper jaw presented some very large and long teeth, much swelling of the soft tissues, with copious suppuration. The teeth were loose, and the cuspids and bicuspid seemed to move together.

His case had been diagnosed as necrosis, but as there was entire absence of the characteristic discharge, and to my touch the teeth moved independently of the jaws, I came to the conclusion that the condition was abscess caused by the teeth, and that removal of them would effect a cure. The evident ankylosis of the teeth, the enlargement immediately behind and connected with the bicuspid, and the excessive size of the apex of the roots as shown by the probe left no doubt in my mind that we had to deal with an odontocoele.

I was quite unable to convince the patient's medical adviser of the correctness of my diagnosis before the operation, hence I was obliged to await the result. There was no question as to the necessity or propriety of operating for him, as, whatever the condition, operation was the only way to obtain relief.

The patient was anæsthetized with nitrous oxide. Ether was

immediately added and ether narcosis induced. An incision was made along the necks of the teeth extending as far as the boundaries of the tumors, and the teeth seized with forceps and the several bodies removed. These I show in this connection. The odontoma of the left side is an irregular mass, one and one-fourth inches long by three-fourths of an inch in thickness, consisting of a cuspid, first bicuspid, and an aborted second bicuspid and molar. The crown of the cuspid and first bicuspid are normal in form and development. The root of the cuspid is enormously developed, it being seven-eighths of an inch long, the portion near the apex one-half of an inch in diameter, and much curved backward. The root of the first bicuspid is also very large, and the surfaces of both are very irregular and rough from hypercementosis. The second bicuspid and molar are entirely rudimentary, a section showing the irregular formation of secondary dentine, with no pulp cavity remaining and hardly a trace of a formerly-existing one. The cuspid was separated from the rest of the tumor, and with no sign of pericementum. The other three teeth were fused into a single mass, and were nearly covered with what seems to be serual calculus.

The tumor from the left side consists of three teeth,—cuspid, bicuspid, and molar,—and is very similar to the other. The cuspid and bicuspid crowns are normally developed, the cuspid root very long and large, and the root of the bicuspid also very large, and both very irregular. The molar is a little more regular in form than the one on the left, with quite a large pulp chamber with a branch corresponding to a root canal, the whole forming one connected mass and covered with calculus. Attached to the right bicuspid is a portion of the alveolar wall united with it by complete ankylosis. There is also a small portion of bone attached to the left cuspid. There is no sign of necrosis on either of the tumors. The patient made a good recovery.

In March, 1891, the same patient returned to the hospital with a chronic abscess discharging under his chin on a line with the bicuspid teeth, and nearly in the median plane, which had failed to yield to continued treatment. The location of the fistula had misled all who had observed it, consequently he had suffered from it for a considerable time, and he now came to see if his teeth had anything to do with it. He supposed that all his teeth had been removed. Upon probing I found roots present which were evidently causing the abscessed condition.

He was again anesthetized with nitrous oxide. I attempted to remove the roots under the gas, but this was not readily accom-

plished, the brief narcosis not being sufficient. Ether was administered, and the roots removed. The left root proved to be a bicuspid with very excessive hypercementosis and with calcareous deposits; the right, an unusually large cuspid root. The specimens you see with the others.

In the two years since the first operation, his upper jaw has become absorbed until his mouth is about the size of that of a child five or six years old. It would measure less than one inch from one molar ridge to another. It was a surprise to every observer.

The patient has not reported since the last operation, but I feel there is no doubt of his complete recovery.

Dr. Clapp.—I have been very much interested in the paper of Dr. Stone, and also in the remarks of Dr. Fillebrown, and I am very glad that Dr. Stone has emphasized the fact that these tumors he speaks of occur so rarely. Now, I have entered on my twenty-first consecutive year of practice in Boston, during which time I have probably seen at least an average number of patients with other practitioners, and during this whole time I have never seen a single example of either of the classes of tumors that has been mentioned. I might say further, in reference to the liability of cancers occurring from ragged roots or ragged teeth in the mouth causing irritation, I did have a patient many years ago who had a tooth of this kind. There was at that time a slight irritation that had been caused by the rough edge of the tooth, and I advised its extraction. I never saw the case again, but I learned some time afterwards that the patient died from cancer of the tongue caused by that tooth.

Dr. Codman.—I cannot say much on this subject. I have been looking for such tumors all these years and have seen very few, only one or two in all my practice, and those not important enough to fix in my mind, and yet I do not believe I have overlooked them. I think that we are not liable to meet with tumors of the jaw outside of the hospitals, except such small ones as can hardly be called tumors. It is important that some person should take up the subject as a specialty because the average dentist sees so few cases, and certainly if I had a patient with anything of that sort I would refer him to a specialist rather than perform an operation myself. I have read volumes on the subject, seen hundreds of plates, and yet have never been acquainted with an important case. I don't remember seeing one that I could bring forward at this time to interest the society.

Dr. Preston.—I don't know that I can say much about tumors, unless that term includes what are usually called "gum-boils," and I

don't see that any one gives a cure for them. I have had three cases of that kind situated in the roof of the mouth. They were thick and sometimes as large as the ball of your thumb, and in my practice of over fifty-two years I have only met with three cases. I have never heard of a cure for them; they generally dry up and disappear themselves, and all that I can say is, remove the cause, which is generally a dead tooth, and the swelling will disappear.

Dr. Smith.—Of course the case which Dr. Preston speaks of must be alveolar abscess, induced, as he says, by a dead tooth, and I think the majority of practitioners are curing such cases now without removing the tooth. The track is always there, and the seat of the abscess can be reached without extracting the tooth.

I will relate a case in practice of a tumor that was not a tumor. It was a case of severe swelling on the left side of the face low down in the jaw. The patient went to a surgeon who is on the staff of one of the hospitals here in Boston for treatment. He examined her carefully in his office and pronounced it a tumor, and advised her to go to the hospital at once and have it removed. Not satisfied with that, and being naturally fearful of undergoing an operation, she consulted another surgeon. He was not quite so positive in his diagnosis of the case, yet he also thought it was a tumor, and said that she had better go to the hospital and prepare for an operation. She finally came to my office, and the condition of the face when I saw it was the same as when she visited these two surgeons. The swelling was very hard, and she could hardly open her mouth,—not enough to admit a mouth-mirror,—so the examination was conducted under difficulties. I found that a tooth had been extracted on the affected side, and on further examination I decided that the fang of a wisdom tooth was still there. Pressure revealed no soreness either within or without the face. A fine probe was introduced and it passed down indefinitely, so to speak, and I came to the conclusion that the trouble was produced by this wisdom tooth. I advised its extraction, which was consented to, and with the aid of antiseptic washes and applications to the outside of the face that so-called-tumor disappeared. I mention this merely to show how, as Dr. Stone says in his paper, a physician could be mistaken in his diagnosis and call a swelling a tumor, when the trouble proceeded from a tooth. It is in such cases that the services of a dentist might frequently be of great service.

Dr. Taft.—I had recently a case in practice so analogous to that of Dr. Smith's that I will merely mention it. The patient presented herself one day with a very large swelling on the gum directly over

the root of the left superior canine. It was then much smaller than it had previously been, but when she came to me her whole lip was so swollen that her face was much disfigured. The swelling was very hard, with no fluctuation. Not being sure just what the trouble was, I thought best to consult a physician. It seemed to me that it could not come directly from the canine root, it was so small, but of course I had it in mind to remove the root sooner or later. The physician who consulted with me pronounced the case a cyst, as I had thought it probably was. After an application of cocaine, the cyst was lanced, and a very thin and copious watery discharge came from it. The patient was given gas and the root removed, and the swelling subsequently disappeared. It seems to me that that case was not really a tumor, but a simple cyst. Having so few of these cases in practice, a correct diagnosis is often difficult unless we keep ourselves well informed in dental pathology. Cases of epulis are the ones which we are most likely to meet with in practice, and I recall, as a student, how difficult it was to distinguish them from a simple hypertrophied gum. I feel quite interested in the subject of epulis, although since leaving the Harvard Dental School not a single case has come to my practice. I remember seeing at the Infirmary many operations for their removal, and call to mind how vascular some of them were. I am quite interested to know whether they can be removed successfully by a simple cutting away to the alveolus and a thorough scraping of the process.

Dr. Fillebrown.—Mistaken judgment seems to be one of the subjects that has come up here, and it is always very easy for us to see other people's mistakes and overlook our own. I have no doubt that I make my share of them and that other people see them and criticise them. I have three cases in my mind that illustrate mistaken judgment. Some years ago a patient of mine was taken ill and had a swollen face, and went to a physician who treated him for erysipelas of the face, gave him a good long treatment, and brought him through to a splendid cure. Soon after this the patient came to me with a fistula on the gum in the region of the apex of the cuspid tooth. He had suffered from an alveolar abscess. The other two cases illustrate mistakes arising from over-confidence in specialists. One of them presented a large swelling in the cheek which a physician pronounced an alveolar abscess. A short examination proved to me that the swelling was not attached to the jaw, and I said to the patient, "This is simply an abscess in the soft tissues, and if you will continue poulticing it you will soon

find relief." In speaking of this case later to a surgical friend, I explained why I considered it an abscess in the soft tissues and not an alveolar abscess,—namely, because it was entirely free from the jaw. Some years afterwards my surgical friend was called upon to treat a man who had a swelling in the right inferior jaw. He passed his finger in, and decided that the swelling was not connected with the jaw, and told the patient that it was a tumor and ought to be taken out at once. A few days later the patient came to me, and I saw that without a doubt his trouble was an alveolar abscess due to a first inferior molar, and it was as markedly connected by a fistulous canal with that molar as in any case I ever saw. The surgeon is surely as bright as any in New England and yet he was in error. After a little treatment in connection with the tooth the tumor got well.

A good illustration of epulis presented itself at the dental hospital the other day. The patient came for the extraction of teeth, and after they had been removed there was to be seen floating about in the mouth an epulis fully as large as the end of my thumb, and attached to the jaw by a little slender cord not one-sixteenth of an inch in diameter, but quite long.

Dr. Eames.—It is quite easy to pronounce a swelling in the jaw a tumor, but not so easy to classify it. There is a good deal of confusion with regard to epulis. I should like to know whether the cases spoken of here to-night were submitted to a microscopical examination; if not, I should reserve my judgment with regard to two of them. The term epulis indicates nothing as to the nature of the growth, and it would seem better to drop the name altogether and adopt some term which would indicate in a degree the origin and structure of the growth. The treatment should vary in accordance with our conception of the disease. If it is a tumor originating in the periosteum or endosteum of the alveolar process, then the alveolar process and a considerable portion of the jaw should be removed. I agree with Dr. Taft as to the difficulty of diagnosis. Quite a large growth may come from the irritation of a deposit of tartar. Three years ago I treated such a case by simple excision, and there has been no return up to the present time. On finding a swelling, we as dentists should first look for a foreign body or irritating cause, and attempt its removal. If there is not a rapid cure following local treatment, we should submit the growth to the microscope as suggested by Dr. Stone in his paper. Thus the case can be diagnosed more clearly and treated more intelligently.

Dr. Stone.—I don't know that I have anything to add to what I have already said, but the point that tumors of the jaw are rare I think will be borne out by surgeons as well as by members of your society. I have under observation rather an interesting case of an apparently healthy young woman between twenty-five and thirty years of age, who some time ago was attacked with a severe pain about the position of the mental foramen, a very severe neuralgic pain that had to be controlled for the time being with morphia. When I saw her later the pain had disappeared, but there was no feeling in the teeth on one side as far as the centre of the jaw, and there was no feeling in the lip and skin outside. Upon the jawbone, not in the alveolus, was a swelling about the size of a walnut; it was evidently a new growth inside the jawbone which had pressed upon the nerve and caused the pain, and finally the destruction of the nerve and consequent paralysis. The nomenclature of tumors has been changing so rapidly in the last years that it is difficult to agree upon a precise meaning for a given term. The word "tumor" is a general name, meaning swelling, and "epulis" means a new growth from the gums. The diagnosis and consequent operative procedure will have to be governed by what the pathologist may decide in a given case.

Subject passed.

Dr. George T. Baker.—I have here a simple device which I use to insert a tooth temporarily in the mouth in case one has been extracted. It is only the work of a few minutes. It consists of a yoke of thin platinum wire, the two arms of which bend over the teeth adjoining the space to be filled. A plate tooth is ground to fit the gum and rest upon the yoke. The tooth is backed with platinum and soldered, and finally tied in place with floss silk. When properly tied it is very firm and serviceable.

Dr. Fillebrown.—Here is a piece of jawbone brought to me by a patient, and taken from the Florida mounds. Some of the teeth have been broken off, but two of them are whole. The broken ones show a perfect quality. The owner of this jaw must have lived several hundred years ago, for it is partially petrified.

Dr. Meriam.—I have always had trouble in finding a suitable clamp for lower bicuspidis where the molars were lost, owing to the rubber tipping the clamp forward. Last fall I asked Dr. Ivory to make me one; he has followed directions carefully, and the clamp I show is the best I have used. The bow goes up at nearly right angles, and the leverage is but slight. Mr. Knapp offers to keep them if there is a demand. I show also a pair of tweezers. I

cannot call them original, as since I had them made I have found a similar but stouter form in some of the trade catalogues. Mine must therefore be called a modification, and will be found useful in reaching into deep cavities. They are short enough to be easily used at any angle. The cut I shall introduce shows them at half-size.



I had them made by Mr. Goldthwaite, on Washington Street, where they can be had, or ordered through any druggist or dealer in surgical instruments.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

HARVARD ODONTOLOGICAL SOCIETY.

THE regular monthly meeting of the Harvard Odontological Society was held Thursday evening, March 26, 1891, at Young's Hotel, Boston. The President, Dr. J. E. Stanton, in the chair.

Thomas J. Giblin, D.M.D., read the paper for the evening.

(For Dr. Giblin's paper, see page 614.)

Dr. Briggs.—Mr. President, I, in common with every one who has started out in practice, was impressed with the possible dangers arising from the use of the tincture of chloride of iron. As Dr. Giblin says, it was pointed out that the presence of the free acid in that preparation was the danger. As a matter of practical experience, I have learned to take the opposite view from that of the writer. My clinical experience has rather led me to feel that the tincture of chloride of iron simply stained, and that it did not, to a great extent, injure the teeth. Of course, as Dr. Giblin has pointed out, if a tooth is put in the tincture it does attack it very freely, but its position in the mouth is very different. If any acid gets into the mouth, the action of the salivary glands is to increase their flow,—it is nature's means of diluting that acid, and is done in so short a time that there seems to be little opportunity to attack the teeth.

I have come to the conclusion that the condition of the teeth in

patients using chloride of iron is caused not so much by the medicine as by the systemic condition which called for the medicine. The condition for which the chloride of iron is used is generally a pretty serious one,—it is usually attended with a great deal of wasting. We speak of it as a tonic, but unlike many tonics it is not for the system that is simply “out of tone.” In fact, a person is out of tone oftentimes when he is apparently pretty well nourished, when he has plenty of blood, and there is no wasting disease. In that condition the tincture of chloride of iron is not necessary; in fact, it produces a plethora if given at that time. In many cases where it has been given unguardedly it has produced this plethoric condition, and patients will say that they cannot bear iron because it gives them this full feeling. In the cases where it is given, as the writer has pointed out, it is to supply the red corpuscle of the blood, in the wasting conditions of scrofula, phthisis, and other diseases of like grave nature.

I, of course, am speaking without preparation, not knowing the line of thought of the writer until to-night, but should be very glad to hear the impressions of others on this subject. To sum up, the conclusion at which I have arrived, as a result of what experience I have had with this drug, is, that it acts merely to stain the teeth and make them unsightly, but the mischief, when it has been coincident with the taking of the iron, has been due to the condition of the patient rather than the presence of the drug in the mouth. What the nature may be of the secretions after it has entered into the system,—whether secondarily it may be a medicine of bad import to the teeth,—I have no knowledge.

President Stanton.—Dr. Giblin has pointed out, to me at least, a certain phase of the question, perhaps not directly bearing upon his paper, but one which I think will surely come home to most of you, and that is, in regard to a thoroughly good understanding between the practice of medicine and the practice of dentistry. It seems to me every day that the dentists and the physicians are going to conflict more and more unless they understand each other better. Within the past year I have had patients from physicians who have sent them to me and indicated a certain line of treatment, insisting on that treatment as physicians. Recognizing that the physician—at present surely—has the better hold, I concede the point and do my best under the circumstances. Of course, very many times it is a failure from a stand-point of dentistry. The patient goes into it with a full understanding of my position in the matter, and the result, easily foretold, is no surprise, and so far as

I know I have been sheltered from any blame in connection with it, but I know it is perfectly possible for us to suffer severely from the influence of physicians, and especially from physicians of the homœopathic school. If they practise true homœopathy, as many do in the city of Boston,—perhaps more here than anywhere else,—the drugs absolutely necessary for our purpose will conflict with their remedies, so that it is pretty hard sometimes to know what line to take.

Dr. Cooke.—The president's remarks bring to mind a case of mine which will serve to illustrate the point he speaks of. A patient came to me with a large growth upon the inside of the lower jaw, growing between the teeth. I cut a section from it and had it examined by an expert, and also showed the tumor to him in the mouth. He pronounced it to be of a serious nature, but thought there would be no harm in my trying, for a time at least, to see if I could cure it. I cut it with a bur and lancet, and from time to time cauterized it. In a short time there was but a point remaining. When left to itself for a week or ten days it would grow up again, and I was obliged to renew treatment. The patient consulted a physician for an eruption on the face. He prescribed certain drugs for her to use, and during their interview she told him that this growth on the gum was being cauterized from time to time with nitrate of silver, whereupon the physician said that this treatment must be stopped, as the nitrate of silver would interfere with the remedies which he had prescribed. The treatment therefore stopped. That was about a year and a half ago. I did not see the patient again until a few days ago. The growth was about as large as it was before. Where there is a case in which the services of both dentist and physician are required, the patient will invariably follow the physician's advice.

Dr. Werner.—I have seen but little of the injurious effect due to the use of the tincture of chloride of iron spoken of by the essayist. The patients mentioned by him were undoubtedly in a low state of vitality or resisting power.

Dr. Briggs's remark is very forcible, to the effect that the acid is almost immediately neutralized by the increased flow of saliva caused by the presence of acid in the mouth. We are inclined to expectorate or swallow very soon after acids are tasted, on account of the increasing quantity of saliva, while the tooth in the bottle has no alternative but to submit to decalcification.

Dr. Niles.—It seems to me very true that a weak and enfeebled condition of the system might affect the vital resisting power of

the teeth, but at the same time it will also affect the chemical constituents of the saliva. The normal reaction of the saliva is alkaline, in health, when secreted in abundance, but if a person is ill, the saliva may become insufficient to counteract the effects of an acid; therefore, if the tinctures be given under these circumstances they have a better chance to act upon the teeth. I have never seen a case, where the tinctures have not been administered, that the teeth have deteriorated in the manner referred to,—unfortunately it has always been where the tinctures have been introduced. I know that the physicians endeavor to show that it is due to the condition of the health and not to the medicines given, but I once had an opportunity to disprove this very decidedly. Some time ago a patient of mine was under treatment by one of the leading physicians of this city,—a man well known and of unquestioned reputation in his profession. He gave this patient lime-juice as a gargle, with instructions to be used every two hours during the day. This treatment had been continued for two weeks, and having seen the patient just before she was ill, and seeing her again just after she recovered, I had an opportunity to mark the result, and found her teeth very much decalcified over the entire surfaces, the enamel being very chalky. I asked her what she had been doing, and on hearing her story I promptly told her that the medicine she had been using had probably acted upon her teeth. The lady was very indignant, as she had asked the doctor, before commencing treatment, if the medicine would injure her teeth, and he said, "Oh, no, you need not be at all alarmed; if it does, I will get you a new set." She reported to him what her dentist had told her, and he replied that her dentist was an alarmist and an extremist, which she promptly reported to me. I asked her if she had any of the medicine left that she had been using? She said she had, and brought it to me. I divided the medicine into two parts. I put a part of a tooth into each solution, and told her to keep one of the bottles three days and then take it to Dr. —, and show him the result. The effect of the medicine was identical with that shown upon her teeth. The physician made a great bluster and went around to his dentist, who told him it was all a humbug, and that it would have no effect whatever on the teeth in the mouth. Both these men—the dentist and the physician—are well known to you all. Tincture of chloride of iron is not the only medicine that will affect teeth. There are many other remedies in common use that will produce the same effect if not cautiously given and the danger guarded against by the use of alkalies.

Dr. Giblin.—I only wish that my experience had been as happy as that of Dr. Briggs and Dr. Werner in the matter of never witnessing the injurious effect of the tincture of chloride of iron upon the teeth, but since the appointment was made for me to read a paper I have been more attentive to this matter than ever before, and I have had no less than fifteen patients since that time,—a few days over a month,—whom I could assure you had been victims of the tincture of chloride of iron. Only yesterday afternoon a lady came to my office for whom, a year and a half ago, I repaired what damage had been done to her teeth and pronounced them in good condition. When I saw her yesterday I was very much surprised, as some of the molars were disintegrated down to the margin of the gum, and there were numerous approximal cavities in the anterior teeth. I asked her if she had been using medicine, and she told me she had been taking tincture of iron for over a year. There was very little stain upon her teeth,—they were all simply disintegrating. The cases which we particularly notice, and ask if they have been using iron, are those cases where the teeth have been discolored, but those are just the cases in which the least damage is done. You will find that the iron used in those cases has been in the form of an elixir, being generally combined with syrup and alcohol, and on placing a tooth in the solution for twenty-four hours there is no effect, other than to adhere to the tooth and stain it, but if you place that same tooth in a solution of tincture of chloride of iron in water for the same length of time you will find that the enamel is quite easily scraped off with an instrument. The saliva has precisely the same effect as water. In a person who is using the chloride of iron it is never sufficiently alkaline to counteract its effect, and if it is acid when it is used it will have no neutralizing effect, but increase its activity rather than diminish it.

In my paper I said that I would not suggest a remedy, because I thought it not our duty and our privilege, although I think I could if I felt free to do so. I think, in the first place, that there are other salts of iron that will have as good an effect on the system as the tincture of chloride of iron, but the latter is more commonly used because it is a very cheap and effective preparation. The other salts of iron are usually expensive, such as the citrate of iron, and most patients will question a druggist's bill rather than a doctor's. I think there are few who are aware of the extent to which the chloride of iron is used, and the result of my investigations on this subject was a surprise to me.

I do not maintain that the tincture of chloride of iron always

has this bad effect, as there are some physicians who insist upon precautions being taken to prevent its action, but I do not think it is a universal practice among physicians to caution patients. This week I saw a prescription which was given to a lady, which read something like this: "Two drachms of tincture chloride of iron to one ounce of water and a certain quantity of syrup,—teaspoonful to be taken three times a day, after meals," with no further directions or cautions. I have no doubt but what the effects of it will be seen in a very short time.

Dr. Briggs.—I would like to ask Dr. Giblin if from his experience he would undertake to say positively whether in these cases it is the primary or secondary effect of the chloride of iron, if he can be sure that the effect which he speaks of is the result of the tincture of chloride of iron as taken into the mouth, or the effect on the system after it has gone into the stomach, and if he thinks it would have as serious an effect if the experiment could be tried of giving it to a person in perfect health?

Dr. Giblin.—That is a difficult question to answer. In the first place, I have never met a person in my experience who has taken this tincture while in perfect health, but in cases of local lesion, such, for instance, as diphtheritic sore throat, where it is a frequent remedy, its effect is noticeable. Since paying attention to the subject a college friend of mine was troubled with diphtheritic sore throat, and tincture of chloride of iron was prescribed. They used the medicine in dilution, and I noticed in his teeth a great many white spots, and since writing the paper I have noticed that the action of acid on the teeth always begins with a white spot, especially the hydrochloric. If a tooth is put in a solution of hydrochloric acid, the first appearance is a white spot, and then it rapidly covers the whole surface. I could not reach my friend lately, or I would have been able to make some mention of the further progress of his case. I thought it was the free acid that caused these white spots and carried on the work of disintegration. In the works on therapeutics I could find no mention as to the manner in which it affects the teeth.

Dr. Briggs.—I do not wish to go any further in questioning the injurious effect of the tincture of chloride of iron as it goes through the mouth into the stomach. My clinical experience with regard to the effect of this medicine has been so limited that I would not undertake to refute Dr. Giblin's careful investigations, but it did not seem to me that it could have this effect in merely passing through the mouth. I would also say that I have never seen acid

saliva from the parotid glands. Possibly it does exist, but I have never yet happened to test it at a time when it was acid. Those are the largest glands, and those are the glands which, if an acid be introduced into the mouth, will increase their secretion, while the acid glands will be checked for the time. The effect of an acid in the mouth is to increase the flow of an alkaline gland, and *vice versa*; the effect of an alkali increases the flow of the acid glands, and I supposed on the strength of this known principle that saliva would correct acidity by its alkalinity,—not merely diluting as water would do. The tincture of chloride of iron is effective, and at the same time the cheapest of the iron preparations. You will find these cases more frequently where there are reasons for economy, and I may not have seen them on that account.

Dr. Reilly.—I cannot help adding a little testimony in the way of an endorsement to Dr. Giblin's paper. I must admit that I have had a number of cases in a certain class of my patients, and looking at them now, after the remarks that have been made, it strikes me as a little singular that this extreme decay and disintegration of the teeth should be so coincident with the use of tincture of chloride of iron. They have become so frequent that, under certain aspects, I ask patients if they have been using it. I had an opportunity to notice the effects of iron in my own family, though in another form (the syrup of the iodide of iron), and I know positively that it has had an injurious effect upon the teeth of my children; that is, coincident with the use of it the teeth have given out. The chloride, as Dr. Briggs has said, is used for reasons of economy, and it is used to such an extent that I know mothers go to the drug-store and buy it, and keep it in the house as a medicine. I have seen cases of that kind show a destructive effect so marked that there is no question in my mind that it is a most powerful agent in tooth destruction.

Dr. Hopkins.—Does Dr. Giblin think that the iron has anything to do with the black discoloration sometimes seen on gold fillings?

Dr. Giblin.—I don't know what that discoloration is caused by. I used Steurer's gold when it first appeared, and the discoloration was very perceptible on that. If a filling of Steurer's gold were inserted alongside of a gold-foil filling, the Steurer's gold would be stained while the foil would remain bright. It is maintained that this discoloration is caused by particles of steel dropping from our plugger points during an operation, thus oxidizing the surface of the filling and extending around the edges, but I think that is hardly probable.

I would like to occupy a few moments of your time in drawing your attention to the difference between the syrup and alcohol solution, and the water solution, of tincture of chloride of iron. The oxide that is formed when the syrup and alcohol solution is used is an anhydrous oxide. It is very dark and dense, and when deposited upon the teeth protects them from the free acid until it is removed by the natural events in the mouth. In the water solution, the oxide formed is a purely water oxide. The chloride of iron unites with so many parts of water, and forms a simple oxide of iron. This oxide is flocculent, and does not adhere to the teeth. This can be shown in a test tube.

Dr. Bigelow.—Dr. Giblin has intimated that he should not suggest to physicians any means of neutralizing the effect produced by the tincture of chloride of iron, on the ground that the means used might antagonize the systemic effect desired by the physician, and that it was not his duty to do so. If the theories advanced by him are correct, I, as a dentist, should like to hear the practical side of the question and to know what the remedy is. If we are to use our influence with the medical profession in this matter, we should know the remedy, and I would like to hear what it is.

Dr. Giblin.—To reiterate what I said in the paper, the reason why I think it not to be proper for us to suggest a remedy for the evil is from the fact that, not being acquainted with the general effects of the medicine through the system, we may not understand the methods of administering. It is maintained that the tincture of chloride of iron in a syrup solution is not so tenable on the stomach as the water solution, and that a weak stomach would reject it. But even if this were not so, it may not be the reason why it is not always prescribed in this form, as some physicians might think that an alcohol solution would produce an appetite for alcohol in the patient who would use it. We know that such appetites are caused and cultivated by the use of medicine. You will all remember some instance where a habit has been formed—the morphia habit especially—in this way. One of the means of neutralizing the effect is an alkaline mouth-wash. Every patient will find at home a little saleratus that will produce the desired effect.

Dr. Werner.—I think that among the better class of practitioners the tincture of chloride of iron is but very little used, other preparations of iron being usually employed. I do not wish to combat the good points brought out by the essayist. I am speaking upon this question as I understand it simply. I think that coming in contact with fifteen cases of this kind in six weeks is an extraordinarily

large number,—fifty per cent. more than I have seen in fifteen years. I think Dr. Giblin would be doing his duty in speaking to the practitioner who prescribes this drug so indiscriminately.

Dr. Briggs.—I have never seen any works on therapeutics where it has been described, nor in the dispensaries, that have not expressly laid down the fact that it was very injurious to the teeth and that caution should be used. Whatever may be our private opinion of what they are in the habit of doing, if they intend to follow the recognized standards of medical practice they cannot do otherwise than to direct that it be used with care, and, if deemed necessary, something should be prescribed to counteract its effect upon the teeth.

Dr. Clifford.—Does Dr. Briggs think there is any deleterious action from the stain of the piano-wire?

Dr. Briggs.—I have seen the staining of teeth from the piano-wire, and quite serious staining in places where regulating appliances have been left on for a long time, but I have not seen any erosion or wasting of enamel at that point. I imagine it is simply the oxide of iron on the teeth.

Dr. Niles.—Some time ago Dr. Hawes, while instructor in the Harvard School, made some experiments and went through a long list of the salts and tinctures kept at the druggist's, and he found that a majority of them were held in solution only by the acidity. We all know that most acids will dissolve tooth-structure; hydrochloric acid, perhaps, has the most powerful effect, inasmuch as the products formed are readily soluble in water. Sulphuric acid does not act as rapidly. Sulphates of calcium are not readily soluble in water, and as there is a long list of tinctures which are only held in solution by rendering them more or less acid, it would be an interesting study for some young man to follow up this line of experiment and find out what salts are injurious to the teeth. I was told by a physician recently that there were no allusions to this matter in the lectures in the schools. It would be perfectly proper to bring it to the attention of the medical instructors, and I think it would be kindly received by them.

H. L. UPHAM, D.M.D.,

Editor Harvard Odontological Society.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE Eighth Annual Meeting of the National Association of Dental Faculties was held at Saratoga Springs, commencing Saturday, August 1, 1891; the President, Dr. L. D. Carpenter, Atlanta, in the chair.

The following colleges were represented at the meeting:

Baltimore College of Dental Surgery.—R. B. Winder.

Boston Dental College.—John A. Follett.

Chicago College of Dental Surgery.—Truman W. Brophy.

Harvard University, Dental Department.—Thomas Fillebrown.

Kansas City Dental College.—J. D. Patterson.

Missouri Dental College.—W. H. Eames.

New York College of Dentistry.—Frank Abbott.

Ohio College of Dental Surgery.—H. A. Smith.

Pennsylvania College of Dental Surgery.—C. N. Peirce.

Philadelphia Dental College.—Henry I. Dorr.

State University of Iowa, Dental Department.—A. O. Hunt.

University of Michigan, Dental Department.—J. Taft.

University of Pennsylvania, Dental Department.—James Truman.

Vanderbilt University, Dental Department.—W. H. Morgan.

Louisville College of Dentistry.—James Lewis Howe.

Indiana Dental College.—Junius E. Cravens.

University Dental College.—George H. Cushing.

Dental Department of National University.—James B. Hodgkin.

Dental Department of Southern Medical College.—L. D. Carpenter.

School of Dentistry of Meharry Medical Department of Central Tennessee College.—G. W. Hubbard.

University of Maryland, Dental Department.—Isaac H. Davis.

Royal College of Dental Surgeons of Ontario.—J. B. Willmott.

American College of Dental Surgery.—T. Clendenen.

Dr. H. B. Noble, of Columbian University, Dental Department, was also present, but not as a delegate.

The University of Denver, Dental Department, was reported upon favorably by the Executive Committee, and was elected a member of the Association, and its representative, W. F. McDowell, took part in the meeting.

The applications of Western Dental College, Kansas City, and Dental Department Medical College of Tennessee, Knoxville, were reported favorably, and under the rules laid over for one year.

On motion, it was directed that the National Association of

Dental Examiners be requested to appoint a committee of five to confer with a similar committee from the National Association of Dental Faculties in regard to matters of mutual interest between the two Associations, their conclusions to be reported back to this meeting. The president appointed as the committee on behalf of the Faculties Association, Drs. Peirce, Winder, Eames, Truman, and Morgan.

The committee subsequently reported the following resolutions as having been agreed to by the conference committees, and recommended that they be confirmed, which was accordingly done.:

Resolved, That it is recommended to the State Boards that when a graduate, after examination, has been refused a license and his college requests information as to the causes of his failure to pass the examination, the Boards shall furnish the Faculty with a detailed statement of the subjects and questions on which the applicant has failed.

Resolved, That we discountenance the publication by the State Boards of the names of colleges whose graduates have failed to pass.

The committee also reported favorably a communication from the National Association of Dental Examiners, which had been referred to them, as follows:

"As the next session of the colleges marks the commencement of the new plan of three years' college instruction, we recommend that this Association request the National Association of Dental Faculties to require each school to issue each year an announcement containing a list of the students classified in the three grades of seniors, juniors, and freshmen; that this list also in each instance designate the absentees, and that each school be required in the same announcement to publish a list of the graduates of the preceding sessions."

On motion of Dr. Cushing, the term absentee in the foregoing was construed to mean one who for any reason has not attended a full course.

The president being asked to rule upon the resolution adopted last year requiring dissections, decided that it was mandatory.

The following, offered by Dr. Abbott, was adopted by a unanimous vote:

Resolved, That any college whose regularly appointed representative fails to sign the constitution within one year from the time of its election to membership shall be dropped from the roll of membership of this Association.

The American College of Dental Surgery, Chicago, was suspended from membership for two years for violation of the rules of

the Association in accepting students after the prescribed time and giving them credit for a full term.

A resolution dismissing charges against the Philadelphia Dental College was adopted.

The following were offered and laid over for one year under the rules.

By Dr. Hunt:

Resolved, That in case of charges against any college no final action shall be taken until all parties concerned shall have had at least thirty days' notice.

By Dr. Truman:

Resolved, That at all future meetings of the National Association of Dental Faculties the delegates shall consist of members of Faculties, and demonstrators will not be received.

By Dr. Fillebrown:

Voted, That after June, 1893, the yearly course of study shall be not less than seven months, two months of which may be attendance upon clinical instruction in the infirmary of the school, now known as intermediate or infirmary courses.

By Dr. Hunt:

Resolved, That after the session of 1892-93, four years in the study of dentistry be required before graduation.

Dr. Dorr offered a resolution that students who have successfully passed their examinations for advanced standing shall have their certificates given or mailed to them within thirty days after such examinations shall have been completed. Adopted.

The following officers were elected for the ensuing year; W. H. Eames, St. Louis, President; J. D. Patterson, Kansas City, Vice-President; J. D. Patterson, Kansas City, Secretary; H. A. Smith, Cincinnati, Treasurer.

Executive Committee.—J. Taft, A. O. Hunt, Frank Abbott.

The president appointed the following standing committees:

Ad Interim Committee.—James Truman, Frank Abbott, Thomas Fillebrown.

Committee on Schools.—D. R. Stubblefield, J. A. Follett, J. Lewis Howe, J. E. Cravens, S. H. Guilford.

Adjourned to meet at the place of the next meeting of the American Dental Association, on the Monday previous, at 10 o'clock.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE National Association of Dental Examiners held its Tenth Annual Session at Saratoga Springs, commencing Monday, August 3, 1891.

In the absence of the regularly elected officers, Dr. L. D. Shepard was elected president, and Dr. Levy secretary-treasurer *pro tem*.

The following State Boards of Dental Examiners were represented :

Vermont.—James Lewis.

New Jersey.—Fred. C. Barlow, Fred. A. Levy.

Ohio.—J. Taft, H. A. Smith, L. E. Custer, C. R. Butler.

Pennsylvania.—Louis Jack, W. E. Magill.

Georgia.—George W. McElhaney.

Maryland.—A. J. Volek.

Massachusetts.—L. D. Shepard, J. S. Hurlbut.

Mississippi.—W. H. Marshall.

Iowa.—J. T. Abbott.

Louisiana.—George J. Friedrichs.

The following State Boards were admitted to membership :

Tennessee.—J. Y. Crawford.

New Hampshire.—E. B. Davis.

Maine.—E. J. Roberts, D. W. Fellows.

A committee, consisting of Drs. Shepard, Fellows, Crawford, McElhaney, and Magill, was appointed to confer with a similar committee from the National Association of Dental Faculties, for the better understanding of questions involving educational interests.

The committee subsequently reported that the conference committees had agreed upon the following resolutions, which were, on motion, confirmed :

WHEREAS, There can be no question that the main object in view of both the National Association of Dental Faculties and the National Association of Dental Examiners is the better preparation of the young dentists for usefulness in the community, and that to secure this end it is desirable that the State Boards of Dental Examiners and the colleges should work in harmony ; therefore

Resolved, That it is recommended to the State Boards that when a graduate, after examination, has been refused a license and his college requests information as to the causes of his failure to pass the examination, the Boards shall furnish the Faculty with a detailed statement of the subjects and questions on which the applicant has failed.

Resolved, That we discountenance the publication by the State Boards of the names of colleges whose graduates have failed to pass.

The Committee on Colleges reported that they had received reports of the number of matriculates and graduates of twenty-eight colleges, as shown below :

NUMBER OF MATRICULATES AND GRADUATES OF THE DENTAL COLLEGES.	Matriculates.	Absentees.	Graduates.	Ratio.
Baltimore College of Dental Surgery, Baltimore, Md.....	224	3	76	34.3
Boston Dental College, Boston, Mass.....	96		31	32.2
Chicago College of Dental Surgery, Chicago, Ill.....	323		94	29.
Harvard University, Dental Department, Boston, Mass.....	44		15	34.
Kansas City Dental College, Kansas City, Mo.....	110	5	43	40.
Missouri Dental College, St. Louis, Mo.....	90		26	28.8
New York College of Dentistry, New York, N. Y.....	233	8	85	30.9
Ohio College of Dental Surgery, Cincinnati, Ohio.....	208		75	36.
* Pennsylvania College of Dental Surgery, Philadelphia, Pa.....	252	17	94	40.
† Philadelphia Dental College, Philadelphia, Pa.....	315		146	46.3
University of California, Dental Department, San Francisco, Cal.....	63		16	25.4
University of Iowa, Dental Department, Iowa City, Ia.....	161		58	36.
University of Michigan, Dental Department, Ann Arbor, Mich.....	132	1	29	22.1
University of Pennsylvania, Dental Department, Philadelphia, Pa.....	206	3	83	40.8
Vanderbilt University, Dental Department, Nashville, Tenn.....	135		43	31.8
Northwestern College of Dental Surgery, Chicago, Ill.....	14		3	21.4
Indiana Dental College, Indianapolis, Ind.....	96		40	41.6
Dental Department of Southern Medical College, Atlanta, Ga.....	103		38	36.8
School of Dentistry of Meharry Medical College, Department of Central Tennessee College, Nashville, Tenn.....	5		1	20.
University of Maryland, Dental Department, Baltimore, Md.....	163	4	64	39.7
Columbian University, Dental Department, Washington, D. C.....	19		2	10.5
Royal College of Dental Surgeons of Ontario, Canada.....	67		27	40.
College of Dentistry, Department of Medicine, University of Minnesota, Minneapolis, Minn.....	36		7	19.4
American College of Dental Surgery, Chicago, Ill.....	167		49	29.
Aggregate.....	3312		1144	34.5
* 15 female matriculates. † 9 female matriculates.				
DENTAL COLLEGES NOT CONNECTED WITH THE NATIONAL ASSOCIATION.				
German-American, Chicago, Ill.....	23	22	11	50.
Western Dental College, Kansas City, Mo.....	61	1	9	15.
United States Dental College, Chicago, Ill.....	43		11	25.5
College of Dentistry, University of Denver, Denver, Col.....	12		5	41.6
Aggregate.....	139		36	
Whole aggregate.....	3451		1180	

Four colleges, members of the National Association of Dental Faculties, had failed to report,—namely, University Dental College, Chicago; Dental Department, University of Tennessee; Louisville College of Dentistry; and Dental Department of National University, Washington, D. C.

The committee recommended that “as the next session of the

colleges marks the commencement of the new plan of three years' college instruction, that this Association request the National Association of Dental Faculties to require each school to issue each year an announcement containing a list of the students classified in the three grades of seniors, juniors, and freshmen; that this list also in each instance designate the absentees, and that each school be required in the same announcement to publish a list of the graduates of the preceding session."

The committee also reported the following list of colleges which they recommend as reputable :

Baltimore College of Dental Surgery, Baltimore, Md.

Boston Dental College, Boston, Mass.

Chicago College of Dental Surgery, Chicago, Ill.

College of Dentistry, Department of Medicine, University of Minnesota, Minneapolis, Minn.

Dental Department, Columbian University, Washington, D.C.

Dental Department of Northwestern University (now the University Dental College), Chicago, Ill.

Dental Department of Southern Medical College, Atlanta, Ga.

Dental Department of University of Tennessee, Nashville, Tenn.

Harvard University, Dental Department, Cambridge, Mass.

Indiana Dental College, Indianapolis, Ind.

Kansas City Dental College, Kansas City, Mo.

Louisville College of Dentistry, Louisville, Ky.

Missouri Dental College, St. Louis, Mo.

New York College of Dentistry, New York City.

Ohio College of Dental Surgery, Cincinnati, Ohio.

Pennsylvania College of Dental Surgery, Philadelphia, Pa.

Philadelphia Dental College, Philadelphia, Pa.

School of Dentistry of Meharry Medical Department of Central Tennessee College, Nashville, Tenn.

University of California, Dental Department, San Francisco, Cal.

Northwestern College of Dental Surgery, Chicago (defunct).*

University of Iowa, Dental Department, Iowa City, Ia.

University of Maryland, Dental Department, Baltimore, Md.

University of Michigan, Dental Department, Ann Arbor, Mich.

University of Pennsylvania, Dental Department, Philadelphia, Pa.

Vanderbilt University, Dental Department, Nashville, Tenn.

* The diplomas of this college are discredited after 1889.

Western Dental College, Kansas City, Mo.

Minnesota Hospital College, Dental Department, Minneapolis, Minn. (defunct).

St. Paul Medical College, Dental Department, St. Paul, Minn. (defunct).

The report was adopted, and the Committee on Schools was enlarged to consist of one member from each State Board. Dr. Louis Jack was appointed chairman of the committee, and the president, secretary, and chairman were authorized to complete its membership and to fill vacancies.

The following was adopted :

Resolved, That this Association requests the several Boards represented in this body not to indorse beneficiary students.

The following officers were elected for the ensuing year : L. D. Shepard, President ; W. E. Magill, Vice-President ; Fred. A. Levy, Secretary-Treasurer.

The officers were empowered to select the time and place of the next meeting.

Adjourned.

Editorial.

AMERICAN DENTAL ASSOCIATION.

THE meeting of the American Dental Association, at Saratoga, was unquestionably one of the most valuable, in a scientific sense, that has been held for several years. The papers read were generally of a high order and indicated the growing strength of the profession in directions not heretofore thought attainable. Indeed it may be said, without fear of contradiction, that the whole tenor of the essays and discussions thereon were of a character not possible a decade ago. The days when it was thought necessary to spend the hours of a meeting of this kind in discussions on filling teeth or mechanical contrivances, important as these are, seem to have passed away, and the active mind concerns itself now with problems on therapeutics, surgery, and on those profound questions that relate to the origin of life.

The discussions as a whole were not as valuable as they might have been made. The excess of papers limited the time, and the unsatisfactory plan of reading these to an audience unfamiliar with the trend of the thoughts of the writers, left much to be desired in the remarks. Notwithstanding this drawback, the discussions on the comparative anatomy of the teeth and that on surgery held the audience as it could not have been held in past years. We were impressed with the remarks on the latter topic, as exhibiting much ability in the direction of oral surgery. They indicate that we are developing surgeons worthy the name. This was to have been expected, owing to the mechanical training of our profession, but it is none the less gratifying to know that this advance has been made to the degree demonstrated.

The meeting was largely attended and the feeling was apparent that the time had arrived for an advanced step, and this was taken in the appointment of a committee to revise the constitution. This movement was foreshadowed in the address of President Harlan. The old plan of "sections," originally adopted with so much enthusiasm, was regarded as a failure, and that the time had arrived for other modes of developing scientific work. The labor of this committee will be continued during the year with, we believe, satisfactory results, looking to the establishment of this Association on

a more enduring foundation, and, let us hope, to a union of all the national societies.

There was a strong feeling in favor of making Washington, D. C., the home of the Association, and to meet there at least once in four years. There are some practical difficulties in the way in carrying this out, but we hope they may be overcome.

There was less friction than usual, and politics was at no time prominent. The long services of Dr. Walker received a proper recognition in his elevation to the presidency.

Saratoga destroys the social life of a convention, and this was the only unpleasant feature connected with the meeting. The conditions there prevent localization. The members scatter over the place, and have no opportunity for those reunions which made the meeting at Excelsior Springs, last year, one to be remembered.

THE NATIONAL ASSOCIATION OF DENTAL FACULTIES AND THE NATIONAL ASSOCIATION OF DENTAL EX- AMINERS.

THESE two closely-allied bodies met at Saratoga, the first convening August 1, and the latter August 3.

It was not expected that any marked advance would be made by the first-named organization; indeed, it was regarded by the majority of the delegates as unwise to make any move in the direction of an increase of the standard at the present time. The three years' course, which goes into effect this year, was regarded as sufficient until it had been thoroughly tested. Hence the meeting was largely devoted to strengthening lines of present work.

This meeting had been anticipated with some anxiety, as it was feared the harmony heretofore existing between the two bodies would be shattered. The peculiar action of the National Association of Dental Examiners, at Excelsior Springs, Mo., created a feeling of distrust, and the subsequent proceedings of some of the State Boards had evolved a feeling of antagonism in the minds of many connected with college Faculties, that promised nothing but evil results for the future to dental education in this country.

It was hoped, however, that this might be averted by an effort to harmonize differences, and the Association of Faculties very early adopted a resolution appointing a committee of five to confer with a similar committee of the National Association of Examiners. This

was accepted by that organization and the joint committee met. The "Faculties," through one of their number, proposed a basis for compromise, as follows :

Resolved, That we recommend to the National Association of Examiners that they take measures to have the laws of the several States so modified that a diploma from a recognized college shall be accepted, provided said college shall furnish the State Board with the standing of the individual holding such diploma. The statement of the college shall comprise the percentage received in each branch. If this fails to satisfy the Board, the examination provided for by the existing laws shall follow, and in response to a request from the college the State Board shall furnish the Faculty with a detailed statement of the subjects and questions on which the applicant has failed.

This was adopted by the committee of the Association of Dental Faculties and rejected by that of the National Association of Examiners. They positively refused to adopt anything that might seem to be a recognition of the college diploma. This document, secured at so much cost of time, labor, and money, was to them worthless so far as permitting the holder thereof to the right to practise, and they refused absolutely to be a party to any compromise in this direction.

The temper of the National Association of Examiners, as manifested through their committee, was not of a character to bring about harmony ; indeed, it had the reverse effect, and at one period it appeared as though there was nothing for the colleges to do but to carry the matter to the court of last resort. Better counsels prevailed, and a truce was arranged for the present, as follows :

Resolved, That it is recommended to the State Boards that when a graduate, after examination, has been refused a license and his college requests information as to the cause of his failure to pass the examination, the Boards shall furnish the Faculty with a detailed statement of the subjects and questions on which the applicant has failed.

Resolved, That we discountenance the publication by the State Boards of the names of colleges whose graduates have failed to pass.

We cannot regard the question as settled by the wording of the resolution. It would be a satisfaction to be able to feel that these two powerful organizations were in perfect unison. No good result can be obtained by a state of war. The interests of all are jeopardized by the present antagonistic position. The colleges, as we understand it, recognize the importance of maintaining laws, but they hold that these should be developed as the needs of both colleges and the public are made apparent. The sure evolutionary

process is always a slow one, and State Boards cannot expect to overthrow a general law by an attack along all the lines with a force simply destructive. The colleges have made the profession, not the latter the colleges, and it seems to us that it is in the last degree inopportune, if not an exhibition of ingratitude, that the Boards of Examiners should now endeavor, through force of law, to crush the hand that has made their existence possible. It will, probably, be denied that this is the intention, and we have no doubt but that the motives are good, but the action is certainly in the wrong direction, and can have, if persisted in, but one result, the sapping of the life of the schools.

If, as has been stated, the present laws prevent the accepting of the compromise measure as originally presented by the National Association of Faculties, then it is certainly time that efforts should be made the coming winter to have the laws amended.

It may be stated that no legislation will be satisfactory that arranges for the appointment of State Boards through political influence, or these bodies at all, unless there is some certainty that they represent the highest culture of the profession. How this is to be tested remains for future developments, but until something better than we have at present is proposed, boards of examiners should hesitate in introducing forceful measures.

Obituary.

D. FRANK WHITTEN, D.M.D.

YOUR committee appointed to present resolutions of respect to the memory of the late Daniel Frank Whitten, D.M.D., of Boston, Mass., hereby offer the following:

WHEREAS, The members of the Massachusetts Dental Society have learned with deep regret of the death of one who was an earnest, capable, and conscientious member of our profession and of this Society. Genial in disposition, whole-souled in every respect, he made a large circle of friends in the various walks of life.

Resolved, That in his death the profession has sustained a loss which is most sincerely deplored, that this society has lost a valuable member whose modest demeanor and faithfulness in the discharge of every duty made his character one worthy of our highest esteem, and that the example of his life should be kept before us to urge us to renewed efforts for the good of our profession and the community.

Resolved, That this society tenders his family its sincere sympathy in their bereavement.

Resolved, That a copy of this preamble and these resolutions be spread upon the records of this Society, that a copy be sent to his family, and to the *Dental Cosmos* and the INTERNATIONAL DENTAL JOURNAL for publication.

(Signed)

WALDO E. BOARDMAN,
FREDERIC E. BANFIELD,
HORATIO C. MERIAM,

Committee.

RESOLUTIONS OF RESPECT ON THE LATE DR. WILLIAM H. ATKINSON, OF NEW YORK.

At a meeting of the Massachusetts Dental Society, the following resolutions were unanimously adopted:

WHEREAS, The dispensing hand of Divine Providence has removed from our midst a much-loved brother, Dr. William H. Atkinson, of New York, an honorary member of this Society, whose wisdom, learning, and skill called forth our highest appreciation. Therefore, be it

Resolved, That we tender to his afflicted relatives our sincere condolence and our earnest sympathy in their irreparable loss.

GEORGE F. EAMES,
R. R. ANDREWS,
STEPHEN G. STEVENS,

Committee.

Domestic Correspondence.

ERRATA.

TO THE EDITOR:

DEAR SIR,—In the discussion of the paper on “The Injurious Effects of Vegetable and Mineral Acids,” etc., before the Odontological Society (see page 552, in the August issue), I have read as follows: “The tears and perspiration are always *acid* in reaction, and I think all the *alkalies* in the city could not change their chemical reaction.” What I intended to have said is just the reverse,—viz., “The tears and perspiration are always *ALKALINE* in reaction, and I think all the *ACIDS* in the city could not change their chemical reaction.

G. W. WELD.

NEW YORK, August 3, 1891.

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No. 10.

Original Communications.¹

WHAT VALUE HAS ARGENTI NITRAS AS A THERAPEUTIC AGENT IN DENTISTRY?²

BY DR. E. A. STEBBINS, SHELBURNE FALLS, MASS.

MR. PRESIDENT,—The object of this paper, and the presentation of these patients and specimens, is to bring the subject to the notice of the profession more fully, and stimulate to further investigation, and, if found practicable, to bring it into more frequent use.

Allow me briefly to take you over some of the way I have come in my study and experiments. Every observing practitioner who has had a few years' experience has seen teeth that have begun to decay on the labial or buccal surfaces, then, from some cause, the decayed portion has taken on a very dark color, and the progress of the decay has ceased.

The same conditions have been observed in approximal cavities when the adjoining teeth have been extracted; also when, by mastication, the teeth have been worn off till approximal cavities have become exposed. In some mouths a large number of such cases may be noticed.

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the Connecticut Valley Dental Society, June 11, 1891, and the Massachusetts State Dental Society, July 9, 1891.

In the process of change, the ordinary color of decaying tooth-substance becomes darker and darker, till, in some instances, it is nearly black. It also becomes quite hard.

These "black spots" do not decay until, by some means, the "crust" is broken, or disease approaches from an adjacent portion of the tooth.

We are all familiar with the appearance of cavities which have been filled with amalgam.

Can this black-crust condition be produced instantly, and at will? Will it remain? If so, we have a boon of great value.

The constituents of decaying tooth-substance, the elements of the remedy, and the compound formed by the union of the two, with practical results, will be evidence towards a solution of our query.

The "United States Dispensatory" says of argenti nitras: "The solution stains the skin of an indelible black color, and is itself discolored by the most minute portion of organic matter, for which it forms a delicate test. The affinity of this salt for animal matter is evinced by its forming definite compounds with albumen and fibrin. . . . When nitrate of silver, in a pure state, is brought in contact with living tissue, it acts as an escharotic. Owing to a formation of a dense film of coagulated albumen, the depth of its action is very limited; the albuminous coating is at first white, but soon becomes blackish, owing to the reduction of the silver."

The "New American Cyclopædia" says: "With albumen, fibrin, etc., it forms insoluble compounds. . . . From recent microscopical examinations very carefully made by Mr. T. J. Herapath, of England, upon some obscure marks found upon wrappers of mummies, there is reason to believe that the ancient Egyptians were acquainted with the compound of nitrate of silver."

"Taft's Operative Dentistry" says, under "Treatment of Sensitive Dentine:"

"*Nitrate of silver.*—This salt is a powerful caustic, whether applied to soft parts or bony tissue. Its action is somewhat complex. Nitric acid is liberated by the decomposition of the salt when in contact with organic matter. Nitrate of silver has a strong affinity for albumen, uniting with it without difficulty, and the compound thus formed is soluble in nitric acid. When the nitrate is applied to the skin, the immediate result is a whitish mark, caused by the union of the salt with the albumen of the cuticle; but this soon turns black by the reduction of the salt and the liberation of the oxide of silver, when for each atom of this set free there is liberated an equivalent of nitric acid. There

is here, then, an agent that acts promptly on the gelatinous portion of the tooth, destroying vitality to the extent of the combination which takes place, and that, by the decomposition of part of the salt and the consequent liberation of part of the acid, also acts with energy on the calcareous portion. The compound formed by the nitrate with organic constituents of the tooth is insoluble, except with a few substances, and therefore protects the subjacent parts; and the precipitation of the reduced oxide on the surface, it is claimed, affords some additional protection.

"The insolubility of the compound above mentioned prevents an absorption of the nitrate by the dentine, and renders its action necessarily superficial. When the nitrate is neutralized by a union with it of an equivalent of the constituents of the dentine, no further chemical action is possible. The compound formed by this union is soluble in a dilution of the nitrate, and if this be applied in too great a quantity there may be a larger loss of substance than is desirable or at all necessary; for as long as free nitrate remains in solution in the cavity, the insoluble compound is not precipitated, and the surface is therefore exposed to the continued action.

"It is preferable to employ the nitrate in the solid state, or, when this is not practicable, in a concentrated solution, and small quantity, rather than in a copious dilution and repeated application.

"From the observations already made, it is quite evident that no harm can result to the tooth from a proper application of this agent, beyond the portion of it immediately acted upon. The nitrate cannot be absorbed by dentine, but it stimulates the adjacent dentine to more healthy action."

Following is a letter from Professor Charles Mayr, of Springfield, Mass., in response to my inquiry as to what the chemical effect of nitrate of silver is on decaying tooth-structure. This is not the first time Professor Mayr has contributed valuable information for this Society, and for which we hold him in high esteem.

"In regard to the subject in question I would say that many points have to be considered in regard to the effect of nitrate of silver on tooth-substance. The first is the purely chemical effect.

"Now, decay contains lactate of lime (accepting Dr. Miller's analyses, which agree perfectly with my own finding) and organic matter,—the whole permeated by ravenous microbes. The chemical action of silver on the lactates is not very rapid, but after a short lapse of time they are oxidized and the silver reduced. On the organic matter the nitrate of silver acts much more rapidly, being reduced by it, and of course in its turn destroying the organic

matter, but, most of all, it acts as a powerful germicide. Silver salts are nearly as hostile to germs as mercury salts, but have the increased advantage of also destroying the products of the germs, which mercury salts do not to this extent.

"In regard to its effects upon the dentine, I should also say that the various chemical constituents of the dentine have to be considered.

"On the phosphates of lime the action is slow, but terminates in forming nitrate of lime and phosphate of silver.

"The carbonates are rapidly acted on, forming carbonate of silver and nitrate of lime.

"The decomposition in both cases is not complete. A small amount of undecomposed silver salt would remain on the spot touched by the nitrate of silver, and a small amount of undecomposed lime salts. The organic substances would slowly be destroyed by the nitrate of silver.

"Of course there would also have to be had the physiological action of the dissolved silver on the nerves abutting at the spot touched.

"It is not improbable that the silver acts by decomposing the chlorides,—potash and soda combine with the nerve-substance essential to its comfort and well-being; at the same time, it would coagulate the albumen in the nerve-substance, thus forming a plug consisting of albuminate of silver, chloride, phosphate, and carbonate of silver, which plug would be an insulator against pain, and would be equivalent to destruction of the nerve-tissue for the space acted upon."

The use of a solution of the salts has been ineffective in my hands.

For sensitive dentine or cementum I use the salts in the same way as for decay. Senile teeth from which the gum has receded and become inflamed, and the exposed cementum is sensitive on the application of a tooth-brush, are very much benefited by this treatment. The brush can be used with impunity, and the gum becomes harder and much more nearly normal.

Dr. R. R. Andrews has demonstrated very clearly that in some cases decay extends very far into the teeth when the periphery is small. If the decay reaches the pulp the caustic effect of the silver will disturb the quiet of that organ and cause pain. My experiments thus far teach me to be cautious in cases of deep decay.

Where the decayed portion is very thick, coagulation of the salts and organic matter may be so complete as to stop the advance of the union before the deepest lamina is affected.

Argenti nitras is not a panacea for every ill known to the dental profession. In some patients' mouths the visible effects will disappear entirely in a year. In other cases it will be effective in part of the cavities, while in other cavities of the same mouth it will be partially effective or not effective at all. What are the causes of these different results?

A serious objection to the use of this agent is the color it produces where there is the slightest decay. Where the tooth is not decayed no change is produced.

Some patients would object to have it applied to any tooth on account of the color. Others would be pleased to have it used where the cavity would not be seen. But there are thousands who must have some such treatment, or become edentulous. Children who are too sensitive to have teeth filled, or whose parents have not the means to pay for filling, must have some relief, or suffer untold misery, and lose their temporary teeth too soon, thereby involving themselves in life-long troubles. Having witnessed the relief of so many children from constant agony, and their exemption from toothache for years, by the application of this agent, it seems to me it is worthy a larger place in our practice.

For several years I have been testing its effects as opportunities have been presented, though not in that thorough and systematic way I would desire.

By the patients, the specimens I will exhibit, and the cases to be related, I will endeavor to present a fair representation of the subject as far as my investigations have gone.

I will give an account of five cases.

The patients present may be seen, with records of their treatment. The specimens also will be passed around attached to cards on which are the records thereof.

CASE I.—F. H. M., a man about thirty years of age. September 6, 1888, I treated superficial decay in the labial surface of superior cuspids and first right bicuspid; also buccal surface of first inferior molars,—all near the gum. None of these cavities have decayed since.

This patient has twenty-eight teeth, all but six of them having from one to three fillings each. Business keeps him from attending this meeting.

CASE II.—Aged about thirty-five years. Right inferior second molar had a small cavity in buccal surface treated. One year and three months after, decay had begun just under the enamel. Recauterized. One year and nine months later, found decay again

aroused just under the enamel. On excavating for filling, found that the decay had not gone deeper,—only enlarged the periphery. Superficial decay on the left molar of same mouth appeared to have kept perfectly after two years and nine months.

CASE III.—The following communication is from W. H. Ashley, M.D.:

“Some twenty-odd years ago I was kicked in the mouth by a horse, cutting both lips through and splitting the alveolar process of the superior maxillary. From that time I suffered more or less trouble with my teeth. The lower ones frequently caught over the upper ones, severely wrenching them during mastication. The upper teeth were strapped outward and sawed asunder to give room, one having been removed.

“Years afterwards pyorrhœa began to manifest itself, causing much suffering, and, one by one, loss of teeth. Dentists of Michigan, Missouri, Kansas, and New Mexico treated the mouth, but deemed it sufficient to clean the teeth thoroughly beneath the gums. Finally Dr. Olney, of New Mexico, decided to remove the teeth that were beyond hope, and try the potash remedy. After thoroughly cleansing the teeth, strings were wet in liquor potassæ, wrapped around the teeth, one by one, and thrust beneath the gum as far as possible, being left *in situ* until the gum became purple and the thin edges dropped away. For a time this allayed the pyorrhœa, but only for a time, while the retracted gum exposed the dentine, and the irritation resulting caused extreme suffering. I could eat nothing sweet or sour, hot or cold, and even the cold air of winter was painful, forcing me to obey the wise injunction to breathe through the nose and keep the mouth shut. Fruit I could not eat. My love for apples and oranges, etc., was lost in the suffering they caused. All the comfort I got was in Shakespeare's picture of old age *sans* teeth, and I longed to put off the evil day, for the suffering made me dread the cold forceps; in fact, the dentist kindly warmed them, that their touch might not be worse than the extraction. I finally fell into Dr. E. A. Stebbins's chair, under his hands. The pyorrhœa is gone, through his injection of bichloride of mercury solution into the pockets formed, and by bi-weekly cleansing with the same. The sensitive condition he has largely removed by the application of nitrate of silver. I now eat anything, and can drink cold water without the pleasure of life being destroyed by the acute suffering.

“Very truly,

“W. H. ASHLEY.”

This patient was treated in the summer or early fall of 1889. The teeth that were loose are quite firm; the gum is in good condition; there are but *very* few sensitive places on the cementum. After treating for some time with bichloride of mercury (1 to 1000 parts) without satisfactory results, I applied the salts of nitrate of silver to all exposed surfaces of the cementum. The effect was very pleasing to both of us, as his communication indicates. Since then it has been necessary to retouch some places where it has worn off. This patient would have been here to-day if he could have left his family.

CASE IV.—A man about seventy years old. Teeth loose, gums receded, considerable pyorrhœa, tartar quickly redepositing after having been removed. After cleaning the teeth thoroughly, in January, 1888, I applied the salts freely to all exposed portions of the cementum. In a few days there was a very marked improvement of the gum. Since that time the teeth have been much more firm, the gums continue in good condition, and the deposit of calculus is *very* much less. I invited this patient to be present, but, being a farmer, he did not like to leave home.

CASE V.—In April, 1886, I treated four approximal cavities in the inferior incisors of a young lady. In the fall of 1888, on examination, I found them perfectly secure, and did not disturb them. This spring (so she writes me) she had some filling done by a dentist in Connecticut, who told her that the lower incisor ought to be filled. She endeavored to explain to him that they had been treated, by some means, to arrest the decay, but could not make him take in the situation, and so he filled the cavities, saying that they looked as if they had been filled with amalgam, and that it was all, or nearly all, out. She is confident that they had not decayed since my treatment.

To submit this remedy to a severe test, in February, 1888, I invited the public primary school-children to come to my office to have their decayed teeth treated. Thirty-five of them came. I simply treated them without regard to size of cavities, or dead or live pulps,—not being particular even about removing *débris* from the cavities.

In March, 1889, I called them again for examination and further treatment, if necessary. Not all of them returned. On account of sickness in my family, I did not invite them in 1890.

Within the last few weeks I have called and examined as many as I could get of them. I kept a record of each cavity treated, and will give a summary of results.

I requested each one to let me have the teeth which had been treated whenever they should come out (most of them being temporary teeth), but very few recollected my request. Therefore the specimens are not so numerous as I hoped they would be.

At the examination in 1889 I found not a few good-sized cavities where there was no decay in 1888, and the cavities that were treated in 1888, in the same mouths, were as good as when treated. An illustration of this fact you may see by examining specimen cuspid "Nos. 1 and 2." In that case there was no decay on the labial surface, or where the large approximal cavity is, when the small approximal cavity on the other side of the tooth was treated. I have seen many such cases. Of course many of the teeth treated are gone and their places filled by permanent ones.



Figs. 1 and 2 represent the distal and mesial surfaces of a deciduous cuspid tooth. Fig. 1, *a*, shows the distal cavity treated with nitrate of silver, two years and eleven months previous to extraction. No change from the time of application. Fig. 2, *b*, shows cavity on mesial surface, caries commencing subsequent to treatment of No. 1, *a*. No treatment was given this, the destruction progressing with the usual rapidity and covering the entire surface.

These experiments give the following results: Sixty-four cavities, after a little more than one year, show thirty-seven to be successful, fourteen partially successful, thirteen unsuccessful. Twenty-seven cavities, after more than two years, show ten to be successful, five partially successful, twelve unsuccessful. One hundred and forty-two

cavities, after more than three years, show eighty-seven to be successful, thirty-three partially successful, twenty-two unsuccessful.

"Successful" are those that seem to have been kept from further decay. "Partially successful" are those where decay has begun around the original cavity, or decay approached from another place in the tooth,—*e.g.*, where a cavity had been treated in the coronal surface and decay had reached it from an approximal surface. "Unsuccessful" means those where all traces of the silver have disappeared.

Many of the unsuccessful cases have been in mouths of patients of delicate constitution,—just the types of those that must visit the dentist *very often* to have teeth filled.

MANNER OF APPLICATION.

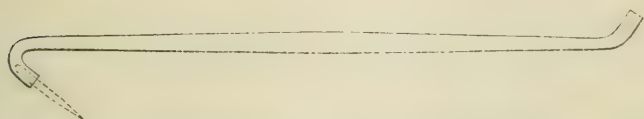
Make, of hard wood, fine, slender points that will enter very small cavities.

Put these points into handles on different angles suitable to reach all portions of the teeth (two points, one on an acute and one on an obtuse angle, will be sufficient).

Pulverize the crystals (owing to impurities in the common lunar caustic sticks, it is much preferable to use the crystals).

The salts are dissolved in an equal amount of water, therefore there should be but little moisture in the cavity, or on the surface to be treated.

Moisten the wood-point a very little, so the powder will stick to it, and then take up on it an amount about the size of the head of a common pin, or more, according to the size of the cavity or sur-



Wood-point set in socket, the apex of which may be round, square, or wedge-shaped, to suit the operator.

face, and apply to every part of the diseased portion. Apply enough salts and moisture to be sure the whole surface is touched. The salts will take effect in a minute or so.

Waste amalgam scraps rubbed over the treated surface, or cavity, will take up the liberated nitric acid and turn the decay dark instantly. (Since writing this paper I have used silver filings.)

I have not sufficient data to determine whether the application of the amalgam is beneficial or not, but theoretically I think it is.

Silver, instead of wood, points may be used.

Of course the mouth of the patient should be protected during the operation.

Any slight touch to the tongue or other parts of the mouth will do no harm. I never heard a complaint of bad after-results. Some dislike the taste.

Use colored napkins so the stains will not show.

Do not allow the patient to wipe the mouth immediately with a handkerchief for fear of getting it stained.

After the salts have taken effect, and you are through with the treatment, at once inject a copious amount of water to carry away the surplus; also allow the patient to rinse the mouth well.

The *manner* of protecting the patient's mouth from being touched with the salts can be determined readily by each operator. Caution

and experience will enable any one to protect the patient's mouth and his own fingers.

SOME POINTS.

Nitrate of silver forms with albumen and fibrin definite compounds, that are insoluble except with a few substances.

It is superficial in its action.

With the phosphates it forms nitrate of lime and phosphate of silver.

With the carbonates it forms carbonate of silver and nitrate of lime.

Superficial decay in labial and buccal surfaces show most favorable results.

Small cavities are more favorable than large ones.

If decay has reached the pulp it is not safe to apply the silver.

In my experiments thus far I have not removed any decay before applying the salts.

Where the gum has receded, and the exposed cementum is sensitive, the effect is very beneficial. In such cases it seems to stimulate the gum to more healthy action.

The liberated nitric acid should be removed.

When asked by patients what the treatment does, I often tell them it kills, embalms, and buries the microbes right in the place where it finds them.

The following patients will now be presented:

CASE I.—Girl. The little pits in buccal surfaces of second lower temporary molars were treated in March, 1886. The apex cavities in upper temporary molars treated in September, 1890. None of these cavities seem to have decayed since treatment.

CASE II.—Boy. The buccal surfaces of temporary molars were treated March, 1886, and have not decayed since. The apices in lower temporary molars were treated in June, 1887, and, having begun to decay again, were re-treated in November, 1889, since which time they seem to have kept well.

CASE III.—Girl. This patient had some cavities treated in 1888 and 1889, which you will observe are in a good state of preservation; while surfaces that appeared sound when the others were treated have large cavities now. For illustration of this case see "cut" of temporary cuspid.

CASE IV.—Girl. This patient had several cavities treated in 1888. A year later nearly all traces of the silver had disappeared, and decay was active. They were then re-treated, and also some

new cavities. Two years later all traces of the treatment had disappeared. Please observe that this girl is very nervous and of slight figure,—just the type of patients that often return to us for filling and refilling.

CASE V.—Man. This patient had six small cavities treated in apex surfaces of lower incisors in January, 1886, and have not been touched since. Please observe that the characteristic results of the treatment are perfect, and the decay has been entirely arrested.

CASE VI.—Young lady. In 1888, when fourteen years old, she had nineteen cavities treated in the upper teeth,—most of them very large,—some adjoining fillings. Her health and nervous conditions were such that she could not have fillings put in, and must have relief in some way or lose her teeth. Present condition: first molars decayed all away. Three cavities that were treated have since been filled. The remaining cavities have the characteristics of the treatment, and seem not to be decaying.

PATHOLOGICAL CONDITIONS PRODUCED BY GALVANIC ACTION BETWEEN DISSIMILAR METALS IN THE TREATMENT OF CARIES OF THE TEETH.¹

BY GEORGE W. WHITEFIELD, M.D., D.D.S., EVANSTON, ILL.

To arrest the causes that destroy the teeth, fillings of different kinds have been and are being used to repair the loss of continuity of tooth-structure, to protect exposed parts, and restore the contour of the organ. Prominent among these filling-materials are gold, tin, cements, and amalgam. Amalgam is composed of varying proportions of tin and silver, with a small amount of gold or platinum amalgamated with quicksilver. There are also amalgams of copper, and some containing zinc.

In a general way, let me now introduce the subject of the all-pervading mysterious form of vibration we call electricity, for this will be necessary to comprehend the galvanic action produced in the mouth by dissimilar metals. Different qualifying names are employed to designate the kind of electrical manifestations, as mag-

¹ Read before Oral Surgical Section of American Medical Association, Washington, D. C., 1891.

netic, frictional or static, galvanic, voltaic or dynamic, and thermal electricity.

We find that all molecular disturbances give rise to disturbed electrical equilibrium; all motion tends to produce this condition. We notice the result only when the conditions are favorable; that is, when the conditions are such that the equilibrium is not too easily re-established.

Electricity is termed positive (+) when it has an accumulation of electrical force to impart, negative (—) when it will require such an amount of electrical energy to restore the electrical equilibrium. The difference of electrical conditions is termed the difference of potential.

Difference of potential is a difference of electrical conditions, by virtue of which work is done by the electrical vibrations in moving from the point of higher to that of a lower potential, and is measured by the unit of quantity of electricity thus transmitted.

The passage of electricity from the point of higher to that of lower potential is termed electrical current, and the bodies along which it passes are conductors. The opposition to the passage of the current is termed the resistance.

In order to understand the action of what is called the electric current, I will give the familiar illustration of two reservoirs of water connected by a pipe. The electric current may be likened to the flow of water through this pipe from the higher to the lower level. The unit of current strength, also called the rate of flow or intensity, is the ampère. In the illustration we would say the water is flowing through the pipe at the rate of one gallon per second. In speaking of the electric current, we would say it has a strength of, say, one ampère.

The unit of electromotive force, also called electrical pressure, or tension, or difference of potential, is the volt. In the illustration the head of water, or the difference between the levels A and B, is similar to the electromotive force.

The unit of resistance is the ohm. Resistance may be compared with the friction of the internal surface of the pipe offered to the water. It follows that the more cross-section the less friction, and the less cross-section the more friction, for the same volume of water flowing through the pipe in a given time.

Conductors are good or bad as they convey or resist the passage of the electrical current; different metals vary in their conductivity, silver and copper being high in the scale, while German silver and steel retard the current; moisture is a good conductor, while glass,

kerite, rubber, and dry air are among the poorest conductors: the resistance varies with the length of the circuit, the conductivity and cross-section of the conductors.

As the current is the same strength throughout its entire length, it naturally follows that the larger the conductors, other things being equal, the less the resistance, and, on the other hand, the less the surface or poorer the conductor, the less the current and reduced activity of the battery. When the current is too great for the conductors the wave length is shortened to that of heat, which varies according to the current and the conductors. The wave length may be shortened to that of light vibrations so that the conductors may glow as in the incandescent lamp or cautery snare. Heat generated in this way is now employed in electric welding and for the fusing of metals requiring a high temperature, such as platinum, iridium, etc.

Magnetism derives its name from the place where magnetic ore was first found,—Magnesia, Asia Minor.

Frictional or static electricity is of but little interest to us as a profession, although often, in a dry atmosphere, it may be a very annoying companion by the dental chair, when each movement of the operator produces by friction a difference of potential between the operator and the patient; then if the discharge is by way of an instrument to a filling, or moisture in a cavity of a tooth, the result, to say the least, is unpleasant, and often quite startling if the patient, by jumping, upsets the instruments.

Frictional electricity is to galvanic electricity what a red-hot needle would be to a large, moderately-heated crow-bar: the crow-bar contains more heat than the needle, but one has volume, the other intensity. Frictional electricity is so intense that it will jump through air, the length of the spark being governed by the intensity of the current.

Galvanic electricity, on the contrary, will traverse the circumference of the globe rather than leap a short space. Galvanic, voltaic, or dynamic electricity is the particular manifestation of this force, most interesting in a practical way to the dentist. The current derived from the battery is called galvanic or voltaic, in honor of the experimenters who, less than one hundred years ago, discovered the method of generating and collecting the force through chemical action. It is this manifestation of electrical energy that is employed in the arts, consequently the name *dynamic*.

Where the extensive use of electricity is required, the dynamo is

employed for economical reasons. Batteries consist of positive (+) and negative (—) elements, immersed in an exciting fluid, or fluids. The fluid employed varies according to the construction of the battery and kind of work to be done, being acid or alkaline; though even pure water will generate a current, if two metals are immersed in it, where one metal is more readily oxidized than the other. (Note the fact that action would take place if the elements were composed of two samples of amalgam, if one was composed of less oxidizable metals than the other.)

The positive (+) element of the battery is the one on which the exciting fluid acts; that is, the fluid destroys the positive (+) element, molecule by molecule, while the negative (—) element should sustain no loss of structure. If the negative (—) element is acted upon by the fluid, counter-currents are generated which interfere with the usefulness of the battery. I spoke of the resistance of the conductors: the fluids of the batteries impose resistance, termed the internal resistance. The electrical energy of a battery is the energy of the current, less the internal resistance, and the resistance of the circuit. The resistance, both internal and of the circuit, modify the action of the battery. If the elements are connected with wire of sufficient size to convey the current, the electromotive force will be reduced in proportion, as the length of the wire is increased, or the size (cross-section) of the wire is reduced; while, if the elements touch in the fluid, the action is most violent, and the batteries soon become polarized; that is, the surface of the elements becomes so charged that the fluid ceases to affect them, or the fluid becomes so saturated with the waste product of the combustion of the positive (+) element that action practically ceases, unless provision is made for it by having the fluid constantly renewed, as in some kinds of batteries designed for constant work.

When the circuit is opened shock is felt, if the current is of sufficient strength: this shock is the result of the accumulative energy being suddenly discharged; different devices are made use of to produce this result, such as the induction coil, constructed with a vibrator, which rapidly makes and breaks the circuit; an example of this is the medical battery, and the Ruhmkorff coil: the current produced in this way is called the Faradic.

Now, to apply the foregoing to the battery formed by dissimilar metals in the mouth, where the fluids of the mouth are the exciting media, gold will be the negative (—) element, as the fluids of the mouth have no action on this metal; the positive (+) element is the base metals, whether used separately, as tin, or, as most com-

monly, the combination of mercury with tin, silver, zinc, and copper, as in the amalgams in use.

With gold and tin to form the voltaic pair, the base metal soon becomes coated, and the current practically ceases; but with amalgam, the mercury performs the same office in the mouth that it does in the laboratory,—it presents the metal in a form that is easily acted upon by the exciting fluid.

We always have good conductors in the fluids of the mouth, containing, as they do, mucus and various earthy salts, while often the fillings touch in the same tooth, or as approximal fillings of gold in one tooth, and amalgam in another.

Resistance varies in each individual case, according to the character of the secretions, or the situation of the fillings.

The action will vary according as the conditions are changed: naturally, where food is left between the teeth to decompose, the acid resulting from such fermentation will form a more exciting media than normal alkaline saliva. Where a filling is left rough and jagged, overhanging and irritating the gums, it presents an exaggerated surface to be acted upon; besides, by irritating the gums, it causes a secretion from them that forms an excellent exciting fluid. This is, unfortunately, the too frequent result of careless operating.

Now, what of all this? Is it only theory? Are these statements founded on scientific facts? Can they be established by proof?

The *Western Electrician* of February 11, 1888, says, in reference to a talk given before the Chicago Electrical Club:

“Dr. Whitefield succeeded in settling a question that has been in dispute among dentists as to the electric action of amalgam and gold fillings in the same tooth, or even in the same mouth.

“That a current was generated by amalgam and gold fillings when placed in water, even when they were insulated from each other, was conclusively shown by bringing a galvanometer into circuit. The point is one that may be combated, but the evidence produced by the galvanometer cannot be controverted.”

Now, if there is galvanic action, what harm can it do? Let us quote from an article on amalgam in the November *Dental Review*, 1887:

“Now the question arises,—Shall we ever use amalgam and gold in the same tooth, and if so, why? and if not, why not? There has been such varied teaching in the past in regard to this subject that it is time the old errors should be exposed and scientific teaching presented to our students of to-day. The old way

was to put both amalgam and gold in the same tooth if it seemed necessary, but never to let them touch each other, or grave results would follow. After seeing such methods pursued for a term of years we find that, in spite of the teachings, grave results did follow, which ultimately resulted in the loss of the gold filling, while the amalgam remained comparatively sound, or, rather, the tooth structure surrounding the amalgam filling."

This is correct, but let us review the writer's following statements:

"We have found that if the two metals touch in the electric battery there is no longer a current,—it is dead, no shock is produced, and it is just the same when the metals are in a tooth in the presence of an acid as it is out of the mouth in the laboratory. Therefore, we found, first from an unpleasant experience and later from theory, that if amalgam and gold are placed in the same tooth they should have an uninterrupted communication, should be in complete apposition, so that no electric or galvanic action can take place because they touch each other."

Let us consider these statements and see if they harmonize with the laws of physics. Now, if the elements touch (the fillings) there is practically no resistance in the circuit; consequently, the battery's action is most violent, up to the capacity of the battery to generate current.

The writer says no shock is produced. He is right; the current flows evenly through the short circuit, so the equipoise is practically maintained, and shock is produced only when the current is interrupted, when an accumulation of energy is suddenly discharged.

Let me try to point out what has misled my friend into making these erroneous statements:

If gold and amalgam touch in the same tooth there is practically less destruction around the gold filling. This is easily explained, as the galvanic action is so violent that the surface of the amalgam filling is soon destroyed; that is, all the baser metals are consumed from the face of the plug, leaving the silver, gold, or platinum of which it is composed on the surface, which practically changes the amalgam to nearly a silver surface, thus raising it to nearly a negative metal, while, besides this, the coating protects even the surface of the silver.

This statement holds true with regard to very old plugs of amalgam: their surface is no longer amalgam, it is negative metal.

But at what fearful cost are such old fillings raised to the dignity of negative elements!

Let us now note some of the harmful phases of this subject.

First, galvanic action has a tendency to accelerate the blood flow, producing hyperæmia and hyperæsthesia, and in some cases violent nervous phenomena. This is especially the case where, from the situation of the fillings, the energy is accumulated, then suddenly discharged, producing shock, as each can demonstrate by touching a bit of zinc or the blade of a penknife to a filling in your own mouth.

Secondly, the current is generated from all parts of the elements that come in contact with moisture and are not protected by a coating. The portion of the amalgam filling that are protected by tooth-structure becomes so coated that there is practically no action except on its exposed surface; on the contrary, gold remains bright on all its surfaces, and, as moisture pervades the whole tooth, no matter how well the filling is inserted, moisture will reach it by way of the intertubular spaces; consequently electrolytic action can take place from all portions of the gold element, naturally causing considerable destruction around the gold filling. And this is not all. Among the commonest elements found in the mouth is chloride of sodium (salt); galvanic action readily breaks up this compound: the chlorine liberates oxygen and unites with the hydrogen of the water, forming hydrochloric acid, leaving the oxygen in its most active state. Other acids may be formed in this way, such as sulphuric, nitric, etc. The electrolytic action and the acids thus formed are sufficient to roughen the surface of the teeth to give lodgement to colonies of "microbes."

Chlorine in its nascent state will readily unite with the mercury of the amalgam, and the chlorides of mercury may be formed in sufficient quantities to produce symptoms of mercurial poisoning in those susceptible to its influences; these salts of mercury may also explain the immunity from decay of teeth stopped with ill-fitting amalgam plugs, the germicidal effects of the mercury being sufficient to prevent colonization by micro-organisms, and consequent destruction of the tooth.

The oxygen might, from peculiarities of the individual case, unite with other salts than those of the teeth, and the same with the acids. We all know that the neglect some mouths get would be total destruction in others. The elements that usually produce decay seem to be inert in their case, and the same condition undoubtedly explains why electrolytic action that would destroy in one case is apparently harmless in others, although such cases are in the minority.

The usual result of placing amalgam in the back teeth, while gold is placed in the front teeth, of children, will explain why the gold fillings have to be renewed so often ; also, that in the electrical action is a clue to the oft-repeated tale brought us by the laity that amalgam stands better than gold, as the amalgam still remains, and the gold fillings, that have been replaced several times, are loose again.

If amalgam must be used, use those grades that will readily become coated, as the coating will reduce the galvanic action, protecting the plug from the fluids of the mouth, except where attrition and brushing keep them bright. Gold and amalgam—in fact any metal—should be avoided for teeth that are of such soft structure that the pressure produced in inserting gold would tend to break down the tubuli, while metals never stand well in teeth of very soft structure ; in fact, you can as soon expect to prevent water flowing under the edge of a board resting on the ends of the blocks in cedar-block pavement in the street as to expect to exclude moisture from a soft tooth with a metallic filling, as moisture is bound to penetrate between the tubuli. Even the normal plasma exuding from the tubuli will have a tendency to assist the destruction of the hard structure when it becomes vitiated, as it must in the temperature of the mouth, as it is as foreign a substance when lost from the tubuli as is the blood that weeps from abraded tissue.

The cements and gutta-percha are the only filling-materials that should be used in such teeth. If you will use these materials, in the course of eighteen months or two years the tooth will be found quite hard and capable of proper manipulation to prepare it for the king of metals and the king of filling-materials,—gold. A tooth treated in this way will not be as sensitive, and the fillings will last.

VITALITY AS A GERMICIDE.¹

BY THOMAS FILLEBROWN, M.D., D.M.D., BOSTON.

THE reign of antisepticism has long been autocratic. Its disciples and advocates are enthusiastic and opinionated, consequently they are impatient of any expressions of possible doubt of the entire correctness of their positions. Hence it requires some consid-

¹ Read before the American Academy of Dental Science, Boston, June 3, 1891.

erable temerity to publicly argue against antisepticism, and put forward asepticism as the more important principle upon which surgical success depends, yet I feel that it is quite time to call the attention of the dental profession to the probability of the doubt, and ask a consideration of the latter position. More than fifteen years ago, at a meeting of the Merrimac Dental Society, I expressed the opinion that the power of micrococci over decay of the teeth was over-estimated; that bacteria alone in contact with the teeth were not sufficient to cause decay; and that certain favorable conditions must be present to enable them to act and cause destruction. I stated my belief that the essential condition was weakened structure, arising either from imperfect formation or from degeneration from some secondary cause; that until the vitality of the structure was weakened the bacteria were powerless. My observations during succeeding years, together with the results of the investigations of bacteriologists and pathologists, have strengthened my convictions, and to-day I feel that I am one of a "powerful remnant," to quote Matthew Arnold, which is sure to become a ruling majority.

Of general surgery I do not presume to have sufficient practical knowledge to enable me to speak with authority, and shall let surgeons speak for themselves.

For facts regarding bacteria I shall rely upon the investigations of experts in that branch.

Of results in treatment of the teeth, and the larger field of oral surgery, I feel that my observations are of some value. It has been proved beyond a doubt that bacteria cause fermentation, putrefaction, and many diseases. It has also been proved and is universally admitted that fermentation and putrefaction never occur except by the action of bacteria; also that certain chemicals and extremes of heat and cold will destroy both the plants and their germs. But it is not generally understood or admitted that chemicals of sufficient strength to destroy the bacteria and their germs will seriously injure or destroy the tissue with which they may come in contact, nor has vitality of the tissues as a practically effective force to destroy the bacteria been sufficiently recognized. Hence vitality as a germicide is what I propose to consider at this time.

The work of the discovery and the identifying and classifying of microbes has been great, and has occupied a long time.

In 1516, Magnatus claimed that the air was full of infectious miasms; Wiseman, in 1692, held the same view, and in 1706, Par-

manus speaks of a lotion which, applied to wounds, resists putrefaction and takes away the pain and inflammation from the wound. That yeast consisted of microscopic cells was proved in 1680 by Leeuwenhoek. That these cells were plants was shown by Tour in 1836. In 1837, Schwann found organic germs in the air, and connected them with the processes of fermentation and putrefaction. It still remained for Pasteur, in 1857, to first observe and explain the mechanism of the relations between fermentation and the vital processes of micro-organisms. Since that time knowledge of bacteria and their action has been rapidly acquired and classified, and now bacteriology is a well-established branch of science.

Delpech, Dupuytren, and Offenbach developed the "subcutaneous method" of operating, which proved so successful. This led to the efforts of J. Guérin and Chassaignac to convert open into subcutaneous wounds.

Soon after Pasteur's researches of 1857, it came to be accepted as a fact that all inflammations as well as fermentations and putrefactions were the result of the action of bacteria; hence, from these premises, Lister's theory that the exclusion of germs from a wound would prevent inflammation and degeneration, and allow immediate healing, was logical. As a result we have, in 1872, Lister's antiseptic treatment of wounds, which has become so famous and productive of so much good. The benefit of Listerism on the progress of surgery cannot be over-estimated, but it should be borne in mind that it was developed at the same time that greatly improved methods of operating were being introduced and the importance of greater cleanliness was being recognized. Lister's genius led him to combine with his great ability the powerful adjuvants of antisepticism and cleanliness, but his modesty led him to ignore to a great degree his consummate skill as a factor in his system. Cleanliness, as such, appeared as only a necessary incident, while antisepticism was to him the basis and framework of his superstructure.

For fifteen years the proposition that antisepticism was the one essential principle on which surgical success depended was hardly questioned. Antiseptic surgery has in theory, though not in practice, ignored to a great degree the importance of three points which, with drainage, have together been the real foundation of the success of modern surgery,—viz., skill, cleanliness, and that other factor so long called "condition of the patient;" this, now, in antiseptic nomenclature, is included in "proper selection of cases," "early operations," etc. All these are circumstances which affect the one condition necessary to success,—vitality.

The bad case makes too great a demand on the vital strength of the patient, and he dies.

The early operation has the full vital power to resist the shock and make the repair.

Listerism, as a system, is based upon the antisepticism of chemical poisons, while the rational system is based upon the asepticism of cleanliness.

The principles upon which Listerism is based are, in their order, antisepticism, drainage, condition of the patient, skill.

The principles upon which the rational method rests are vitality, skill, asepticism, drainage.

Good nursing and nourishment are concomitants in either case.

A further observation of facts will make plain that antisepticism cannot be relied upon, and that it is the asepticism, which is the result of the antiseptic practice, which gives success.

The researches of scientists has established the fact of the existence of almost innumerable kinds of bacteria, varying in their degree of vitality, which cause the disorganization of organic substances, and also forms of pathogenic bacteria, which are the causes of infectious diseases.

The vitality of the disorganizing bacteria is much less than that of the healthy normal cell of animal tissue. The pathogenic germ requires some favorable conditions, not yet well understood, to give it power within the system.

The air around us, the dust under our feet, the food which we eat, and often the water we drink are filled with various kinds of these bacteria. Hence no living being enjoys immunity from their presence.

Although now almost universally abandoned, the use of the carbolic acid spray was at first deemed an essential and indispensable adjunct in Listerian surgery. The carbolic acid (five per cent.), diluted by the steam from the atomizer, and then further diluted by the air into which it was injected, became so reduced that the final strength, which comes into contact with the bacteria floating in the air, is at most only a fraction of one per cent.

The puerility of this spray as a germicide is shown by comparison with facts established by recent observations made in laboratories.

Koch found that the bacteria in broken-down beef-tea were not destroyed in two hours in a four-per-cent. solution of carbolic acid. De la Croix found the same alive after immersion in a ten-per-cent. solution. Koch found that a one-per-cent. solution did

not affect the anthrax spores in fifteen days; a two-per-cent. solution did not destroy in seven days. Hence a less than one-per-cent. spray for two hours would be harmless to the spores.

Dr. Prudden, of the New York College of Physicians and Surgeons, demonstrated—

1. That freezing killed a large number of bacteria.
2. That if the vitality of the bacteria is reduced by exhaustion of nutriment in the culture, great numbers are killed by freezing, but if they are vigorous this will not be the case.
3. Some species are capable of growth after long exposure. The typhoid bacillus resists freezing temperature for a long time.
4. In any given culture the resistance of individual bacteria varies greatly.
5. Alternate freezing and thawing destroy more effectually than constant cold.

The Société Médico-Chirurgicale, of Lyons, conducted a long series of experiments which established the following conclusions:

1. The action of steam under pressure is absolutely efficacious between 112° and 115° C. It destroys the most resistant germs after an application lasting fifteen minutes.
2. Hot air and superheated steam are of less value. At 130° C. certain germs escaped when the application of heat was prolonged twenty minutes!

Dr. Ernst, of the Harvard Medical School, in a paper read before the Harvard Odontological Society, showed that the only sure way of sterilizing was by the application of steam at 212° F. for two hours, as applied in Arnold's sterilizer, and suggested it as an available means of applying the steam for that purpose.

Now, if these observations are of any value and the conclusions reached are facts, how utterly useless it is to think for a moment of producing anything like antiseptic conditions in operations, and how evident it is that surgical success depends upon some other more important condition!

Antiseptic theories were promulgated and the system established when bacteria were considered to be the immediate cause of sepsis in all of its forms. Later discoveries have shown that bacteria have no power over living tissue, but that among the products of putrefaction are alkaloids called ptomaines, which are violent poisons, and which are readily taken into the circulation when brought into contact with an open wound, and cause blood-poisoning effects. A minute amount of the alkaloid will give rise to serious consequences. This is unquestionably the

source of poisoning from eating canned goods, either meats or vegetables, or ice-cream. The vitality of ptomaines resists a high degree of heat, much greater than is necessary to destroy all forms of bacterial life; hence the matter is made very plain. The meat has, before canning, been exposed to infection and ptomaines developed. In canning, the meat is subjected to a heat quite sufficient to kill the microbes but leave the ptomaines undestroyed ready for work, and colic, vomiting, diarrhœa, lassitude, emaciation, and all the long line of ills which follow blood-poisoning are the result.

The action of these ptomaines, independent of any germs, may be learned from the following extract from Senn's "Surgical Bacteriology:"

"That putrid substances injected directly into the circulation produce symptoms of septic intoxication has been known for a long time, and the extensive researches of Panum threw additional light on the subject. It was believed that putrid materials, when introduced into the organism, induced a process of fermentation, to which were attributed the most constant post-mortem appearances found in septicæmic subjects,—fluidity of the blood and softening of the tissues. That these changes were not necessarily caused by the action of living micro-organisms was determined by experiments; as the introduction of putrid blood, or meat infusion that had been boiled for a considerable length of time, produced toxic symptoms, and, when a sufficient quantity was used, death and identical pathological changes in the blood and tissues, as in cases of true sepsis.

"Semmer (*Virchow's Arch.*, Bd. 83) gives an account of the action of septic substances as studied experimentally by Guttman in the pathological department of the veterinary school at Dorpat. The experiments were made with putrid substances, products of inflammation, septic blood, and cultivations of septic bacteria. These researches showed that a chemical putrid poison is formed in putrefying substances, and that a certain quantity of such poison produces symptoms of sepsis and death in animals. The blood of animals killed with such putrid poison was found to possess no infective qualities, and the usual putrefactive bacteria are destroyed in the blood, and only appear again after the death of the animal.

"Buiger and Maas have rendered valuable service in the chemical isolation of ptomaines from putrid substances, and the results of their inoculation experiments established more firmly the fact of putrid intoxication by ptomaines. The number of bacteria in rabbits killed by septic infection is so great that death may ensue from

mechanical causes, while in fatal cases of sepsis in man the number is often so small that it seems natural to suppose that the micro-organisms are capable of producing some poisonous substances which destroy the patient before they have time to multiply to the extent observed in the septicæmia of rabbits and mice."

The statement has been made in the New York Odontological Society that the blood and tissues are full of bacteria. If this were the case, and it were true that bacteria caused putrefactions, we all should be indeed not living, but dead and putrefying.

The absurdity of the statement is shown by the following experiments:

Hauser (Vorkomen von Micro-organismen in "Lebenden Gewebe gesunder Thiere," *Archiv für Experimentelle Pathologie and Pharmacologie*, Bd. xx. pp. 162-202) has made a number of carefully-conducted experiments to show that no microbes exist in healthy animals.

The experiments consisted principally in procuring tissues prone to fermentation, as parts of internal organs, blood, etc., and protecting them against infection from without. He kept the specimens in rarefied air, in filtered air, hydrogen, oxygen, carbonic acid gas, and water, and in various artificial culture-soils, at a temperature favorable to putrefaction, but in all instances in which the specimens remained uncontaminated no putrefactive changes were observed.

By this method he believed he was able to demonstrate that tissues taken from healthy animals immediately after death contained no bacteria, since it is well known that if the specimen were not perfectly sterile putrefaction would have taken place. The author did not only appear to demonstrate that living tissues contained no micro-organisms, but he also ascertained that the preserved sterile organs in time underwent a sort of regressive metamorphosis similar to that which takes place in the absence of micro-organisms, and what is of especial interest, that the product of such processes of resolution possess no poisonous properties whatever.

Watson Cheyne (on "Suppuration and Septic Diseases," *British Medical Journal*, March 3, 1888) found, in his experiments on the presence or absence of micro-organisms in the living tissues, that, while germs were absent when the animal was in a good state of health, yet if the vitality of the animal was depressed, say by administering large doses of phosphorus for some time, organisms could be found at times in the blood and tissue of the body.

Nelson, in a paper read before the American Academy of Medicine, and approved for publication, on "Micro-organisms and their Relation to Disease," says,—

"It has been a widely-disputed question as to whether bacteria ever occur in the animal in a perfectly healthy state; the affirmative view having been taken by Billroth and some others; but it is denied by Koch, by Pasteur, and by Ehrlich, who state that they have never detected bacteria in the healthy animal. The failure of putrefactive bacteria, according to experiments, would go to show inability to struggle against the normal cells indigenous to the soil upon which they were planted. Some bacteria showed power of existence only in tissue in which vitality had entirely ceased, while others seemed to possess the power of existence in the presence of the animal cells when the latter suffered from impairment of nutrition, and the tide of life was turning against them. Abnormal composition of the blood seemed to favor the development of some bacteria, after they had found their way into the tissues."

The relation of pathogenic germs to the healthy tissues is shown by the following, from Senn's "Surgical Bacteriology" (p. 25, *et seq.*):

"From these remarks it is reasonable to assume that pathogenic germs may exist in the healthy body without necessarily giving rise to disease, especially if, as is well known, they are being constantly eliminated through the excretory organs."

Fodor ("Bakterien in Blute Lebenden Thiere," *Archiv für Hygiene*, Bd. ix. p. 129) introduced directly into the circulation of rabbits pathogenic bacteria in order to study their effects on the tissues and manner of elimination. As a rule, he found that they had completely disappeared from the blood after twenty-four hours. No culture-experiments were made less than four hours after inoculation.

He believes that the microbes are removed by leucocytes. He affirms that, as a rule, pathogenic germs are not present in the healthy organism, as he found the blood of healthy rabbits, without exception, sterile; and only in exceptional cases was he able to demonstrate the presence of bacteria in animals killed, even where the examination was postponed until after putrefaction had set in.

The phenomenon, familiar to every one, of blood effused into a contused wound being absorbed and the parts recovering perfect health, without any signs of putrefactive changes, is a clear proof that bacteria are not in healthy blood. Another proof is the fact that cysts form and contain tissue which is taken out of the circu-

lation and has even undergone suppurative changes, and exist long as cold abscesses without a sign of putrefaction or even inflammatory action, and most of such cases will heal kindly if opened, drained, and kept clean.

The results of modern abdominal surgery show that cleanliness, and not antiseptis, is the right bower of success.

I believe the best record that Listerism has shown is to reduce the mortality to about eight per cent., while Lawson Tait, in his last thousand reported cases, without a pretence of antisepticism, but an entire avoidance of it, reduced the mortality to about three and one-half per cent. Mr. Tait had a run of one hundred and thirty-nine cases without a death, while Mr. Thornton, the most persistent apostle of Listerism of the present time, had only forty-eight cases without a death. The testimony of so successful an operator as Mr. Tait upon the harmlessness of germs upon the living tissue is worthy of attention and consideration.

I will quote in full his language upon this subject:

"For my present purpose, therefore, it is enough for me to assume, as I do most fully, that the germ-theory has been completely substantiated, and that no known putrefaction does occur, save by the admission of resting spores, or swarm spores of some of the many minute living organisms which are invariably associated with putrefactive changes.

"But concerning this, there is another constant position associated with this phenomena. The materials upon which the experiments have been made, of infinite variety of kind and constitution, have all been dead, and no one has yet pretended that, by the admission of germs to living matter, he has produced the phenomena of the putrefactive changes which constantly result in matter which is dead. To quote the apt illustration given by Dr. William Roberts in his masterly exposition of this most difficult subject, the ordinary hypodermic morphia-syringe will inoculate inevitably a sterilized solution of dead organic matter, but among the hundreds and thousands of hypodermic injections which are made daily, no one has yet declared a single instance of putrefactive changes resulting from it in the healthy or even in the diseased human body.

"It will, therefore, be seen that the application of the facts of the germ-theory of putrefaction to the phenomena of disease of living tissue is met at once by an overwhelming difficulty, to the removal of which none of the adapters, so far as I have seen, have as yet applied themselves.

“Granting that the same germs which would inevitably produce putrefaction in a dead infusion of beef are constantly admitted to wounds, there is not the slightest particle of evidence that they do produce any change whatever upon living tissue, still less is there any evidence that the changes which occur in the numerous varieties of what we call blood-poisonings, even when they are of an undoubtedly local origin, have the slightest analogy to those seen in a putrefying dead infusion.

“The mere presence of bacteria in the fluids of wounds, or in fluids enclosed in cavities, while offering many difficulties to the adapters of the germ-theory, prove nothing for their positions until they have shown that these organisms ever do occur in fluids or tissues which are truly living.

“The difficulty, therefore, is this: that what we call vital action, for want of a name based upon a better understanding of what it is, places living tissue in an altogether different category from tissue in which the phenomena of life are no longer present.

“Now, this is consonant with every-day experience. If a decaying hyacinth-bulb or a rotten apple be examined, the presence of the minute forms of life is found to be absolutely confined to those parts where the changes have been effected, while those parts to which the rot has not extended are found absolutely free from them, and the difficulty of the adoption of the germ-theory is simply this: that its advocates have assumed that the invasion of the germs is the cause of the decadence of the vital phenomena and the ultimate death, while there is the alternative,—still undiscussed, and certainly undismissed,—that the decadence of the vital powers, due to some cause possibly yet unknown, is that which gives the germs their potential ascendancy, and enables them to do what, during full vital action, they are wholly unable to effect.

“If the view of the germ-theorists were correct, we ought to expect that no operation could be done successfully without rigid antiseptic precautions. The slightest cut of the skin ought to be followed by septic poisoning. There ought to be no difference in the mortality of operations in small and large hospitals, in town and in country. In fact, if germs could have had the unbounded influence which is claimed for them by many antisepticists, surgery must long ago have been an extinct art, if, indeed, it could ever have struggled into existence.

“The uniform experience of operating surgeons has taught them that the success of their work will depend upon three factors,—the

condition of the patient, the condition of his surroundings, and the nature and extent of the operation performed.

"Of these three, undoubtedly, the most uncertain factor is the first. What condition of the system it is which is favorable to operations is almost unknown. I must base my conclusions chiefly upon my own work, and in my special operation of ovariectomy I am perfectly certain that apparent perfect health is by no means a certain indication of a power of resistance to those conditions, whatever they be, which result in so-called septic poisoning.

"The second of these factors, the condition of the surroundings of the patient, contains elements of far greater certainty. It has approached the position of a statistical law that the death-rate is in constant harmony with the density of the population, and when the density exceeds a certain minimum of safety there are introduced specific septic diseases, as typhus fever, which are wholly unknown under other conditions, and which, even after the danger density has been reached, attack certain individuals only, and not all, for reasons which can be expressed only by saying, as I have already said, that the living tissues of those affected could not and did not resist the septic influence.

"Every advance we make in sanitation shows that this factor, the condition of the surroundings of the patient, is of extreme importance.

"The third factor which influences surgical success is the extent and importance of the operation performed. Everybody knows that while amputation of a finger is probably fatal in not more than one in ten thousand cases, nearly one-half of all amputations of the thigh die. Now, if the adaptation of the germ-theory to surgical practice were as promising and legitimate as some of its supporters allege, we should have had the remarkable result, previous to its application, that amputation of the finger and the thigh ought to have approached one another in mortality to an infinitely larger extent than they have done.

"If the contact of a bacterium germ upon a wound could be the source of blood-poisoning, then the size of the wound and the nature of the operation could make but small difference in the result, and a wound into the theca of a finger tendon and one of a similar size into the peritoneum of another patient in the same ward ought to have very similar risks. But, as a matter of fact, they do not, and we are forced to the conclusion that, even if bacteria germs lighting on the wounds are the cause of much surgical mortality, the power of vital resistance by the tissues, or the

condition of the patient and the nature and extent of the operation are of infinitely greater importance as factors in the general result."

No words I can add can make it clearer that vitality—life—is the one effective germicide upon which all surgical success depends. There are, so to speak, two kinds of vitality: the first, vitality of construction; the second, vitality of resistance.

The first is marked by a quick, full pulse, arteries and veins over-full of blood, a well rounded form that counts well in avoirdupois; this succumbs easily to destructive influences. The vitality of resistance holds on to life under deprivations, hardship, exposure, and famine. This is the vitality that those possess who live on through destruction and pestilence when thousands around them die.

In 1827, Bichat wrote, "Life is the sum of the functions which resist death." This life, it appears to me, consists of two forces: first, a power of forming, and second, a power of resisting. The first exerts the positive force of building up during the period of growth and keeping up the repair during middle-life and declining years. The second is a guard ever watchful to keep the system in order, and to stand always ready to resist the ingress of disease in all its forms. This resisting vitality is the true germicide. In the presence of this vitality no bacterium or germ can thrive or live.

Oral and dental surgery furnish illustrations of the positions taken in this paper. Wounds of any character of the mouth rarely suppurate, and but a very small proportion even inflame. Of the vast multitude of teeth that are extracted every year, not one case in ten thousand is followed by septic degeneration. And where such degeneration does follow there is evidently impaired vitality. If bacteria in wounds were alone sufficient to produce sepsis, what dire results must follow so frequent operations as extractions! Complete drainage and constant washing with the secretions of the mouth keep the wounds aseptic, and hence the favorable results.

Again, the treatment of pulp-canals is an illustration. If a pulp is *completely* removed by operation, the cavity dried, and immediately filled, trouble will never occur in a healthy subject. If a canal is already septic and even causing irritation about the root of the tooth, there is no surer way of effecting a cure than to open the cavity, thus giving drainage, and allowing the scavengers to consume the *débris*.

Before the science of antiseptics was so fully developed, this expectant treatment was taught and successfully practised. Pulp-

canals being closed cavities in hard tissue, impermeable to fluids, the use of strong antiseptics was not only unobjectionable, but of decided benefit in hastening the cleansing process. And the asep-
sis of cleanliness brought the successful result.

Finally, I will quote Professor Miller, who closes an exhaustive discussion of the prophylactic and curative effect of antiseptics by saying, "Under all conditions, however, the chief thing is the thorough mechanical cleansing of the teeth."

THE RHEUMATIC AND GOUTY DIATHESIS AS MANIFESTED IN DISEASES OF THE PERIDONTAL MEMBRANE.¹

BY JOHN S. MARSHALL, M.D.²

IN nearly all our text-books on dental surgery and dental pathology, mention is made of the fact that rheumatic and gouty individuals sometimes suffer from irritation of the peridental membrane, causing the teeth to become more or less sore and loosened in their sockets; supposedly the results of the peculiar diathesis of the system, but further than this no light is thrown upon the subject.

Clinical and post-mortem experience teaches that the *materies morbi* of these diseases has a predilection for the fibrous structures of the body, especially the synovial membranes, the aponeuroses of muscles, the dura-mater, the cardiac tissues, periosteal and peridental membranes. The one most commonly affected is the synovial membrane, resulting in inflammatory conditions of the joints.

It not uncommonly happens, however, that there is associated with the inflammatory phenomena of the joints, enlargement of the long bones and nodular formations in other localities; and in the cementum and pericementum, conditions which are somewhat analogous.

The predisposing and exciting causes of certain irritative conditions of the pericementum seem to have their origin in the same conditions which bring about the phenomena of gout and rheumatism, and they have also proved by experience to be amenable, in many cases, to the same specific treatment adopted in these dis-

¹ Read before the Oral Surgical Section of the American Medical Association, Washington, D.C., 1891.

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eases. This last fact has led me to the belief that the rheumatic poison is largely accountable for many of the diseased conditions of the pericementum, and has induced me for several years to make close and careful observation in relation to the prevalence of irritation of the pericementum in gouty and rheumatic individuals.

This belief has been further strengthened by finding, upon analyzing the urine of a number of persons suffering from peridental irritation of this character, that there was a considerable excess of uric acid in every case. The saliva, also, in many cases gives a decided acid reaction.

The peridental membrane seems to be very susceptible to the irritating effects of an acid condition of the blood, whether from an excess of lactic or uric acids retained in the system or from the ingestion of such acids as are found in sour wines and malt liquors.

The habitual use of sour wines and malt liquors often results in peridental irritation of a marked character in individuals who have never developed symptoms of a rheumatic condition; while on the other hand the same irritative conditions are found in total abstainers; but these, it would seem, are due to rheumatic phenomena, and are often the forerunner of an approaching attack of acute articular inflammation.

Congestion and thickening of the peridental membrane and temporary loosening of the teeth, accompanied with dull, gnawing pains and more or less soreness, are a common occurrence in rheumatism and gout. At times this condition is the first definite symptom to be manifested of an approaching attack of acute articular inflammation, while in others it does not make its appearance until after the first acute symptoms have subsided, and occasionally it is the only manifestation of this peculiar diathesis.

Chilling the surface of the body, or, in other words, taking cold, is usually the exciting cause of an attack, while an injudicious diet greatly aggravates it.

The presence of concretions upon the roots of the teeth is the most common cause of inflammation of the pericementum, and it has been generally supposed that these concretions were formed from the saliva.

It is my purpose to call attention to what seems to me to be a more rational explanation of the formation of these deposits in locations where the saliva could not, or could with great difficulty, reach. The saliva contains, as waste products, a certain amount of phosphate and carbonate of calcium which has been rendered soluble by the action of carbonic acid. A certain amount of ammonia

is given off from the lungs as a product of decomposition of tissue; while fermentation of alimentary *débris* lodged about the teeth also furnishes an additional amount of ammonia. This ammonia, coming in contact with the saliva in the mouth, unites with a portion of the carbonic acid to form carbonate of ammonia, thus liberating a portion of the calcium, which is thrown down in the form of a precipitate and lodges upon the exposed surfaces of the teeth. But when deposits occur at remote points from the gum-margin, it does not seem possible that this is the correct explanation of their presence in these locations. The law of gravity carries all bodies that are heavier than the medium in which they are suspended downward; consequently we must look for some other explanation for the presence of the deposits on the roots of the superior teeth.

Capillary attraction may possibly account for their location, but this seems hardly probable, for it presupposes the presence of a pocket, or a separation of the pericementum from the cementum, while the amount of saliva entering such an existing *cul-de-sac* would be extremely small, and not likely to be changed at sufficiently frequent intervals to account for the rapid accumulation which takes place in some of these cases. We are forced, therefore, to the supposition that they are deposited from some other source, and under an entirely different group of circumstances.

It has been suggested by Dr. Ingersoll, of Keokuk, Iowa, that these concretions were a direct deposition from the *liquor sanguinis* which bathes the roots of the teeth during the suppurative stage of the inflammatory process. This may be the correct solution. It is true that calcareous material is sometimes deposited from pus, in proof of which might be mentioned the fact that the roots of teeth penetrating the antrum of Highmore and foreign bodies located in this sinus during suppurative inflammation have been found when removed to be covered with calcareous deposits, but that this is a common occurrence in suppurative conditions in any locality admits of serious question. I am of the opinion, however, that the deposition of the concretions upon the roots of the teeth in those localities not readily reached by the saliva, or in which the presence of the saliva would be an impossibility, are due to the causes which produce the chalky formations found in the joints and fibrous tissues of gouty and rheumatic individuals.

The thought has occurred to me, though I have not had time to demonstrate it positively, that the concretions found upon the roots of the teeth in the locations just named were masses of urate of

soda with phosphate and carbonate of calcium, and that they are deposited directly from the secretions, as is often the case in rheumatic arthritis.

Furthermore, it would seem that these concretions were the cause of the inflammatory condition, rather than the result of it; in proof of this let me state that clinical observation teaches that suppuration often occurs about the roots of the teeth at remote points from the gum-margin, and which have no outlet until the pericementum is dissected from the roots of the teeth by the accumulation of the pus. I have seen cases in the lower jaw in which an abscess had been formed upon the roots of living teeth, between the neck and the apex, and in which the attachment of the gum at the neck of the tooth was intact, and the pus did not escape until nature had perforated the soft tissue, or relief was given by the use of the knife. In such cases I have never failed to find concretions upon the root at the point of suppuration; this could not possibly have been deposited from the saliva; and it is fair to presume that the deposits upon the root was the source of irritation that produced the abscess, rather than that the inflammatory condition was produced by some remote cause and the formation of the deposit the result of the inflammation.

Dental exostosis, or hypertrophy of cement tissue, is an occasional occurrence in individuals of a gouty or rheumatic diathesis. It is most commonly found in chronic cases of long standing and is often associated with enlargement of the joints.

The causes are in all probability the same as those which produce the enlarged joints. Chronic irritation of the periosteum tends to hypertrophy of bone; while the same condition of irritation in the pericementum produces hypertrophy of the cementum. The history of these cases is usually one of chronic irritability of the pericementum, with periodical attacks of soreness and looseness of the teeth, while the cause of each attack is generally referred to some recent exposure in which the individual has taken cold. The acid reaction of the saliva and the urine at these times gives evidence of an acid condition of the blood. This would seem to indicate the cause of the irritation and suggest the line of treatment to control the immediate symptoms and the prophylaxis of the future.

Phagedenic pericementitis is sometimes directly traceable to a rheumatic condition of the system or the uric acid diathesis. In several cases in which I have analyzed the urine, uric acid was found largely in excess of the normal quantity.

In all of the cases which I class as rheumatic, concretions are

found upon the roots of the teeth, and many times in locations which preclude the possibility of a salivary origin.

Under a restricted diet in which meats, wine, and malt liquors are cut off there is soon a marked diminution of the quantity of uric acid excreted, and an equally marked improvement takes place in the symptoms manifested in the oral cavity, which cannot be accounted for by the removal of the concretions and local treatment alone. In one case, which has been under observation for four years, the periodical aggravation of the oral symptoms is a sure indication of the presence of an excessive amount of uric acid in the urine, and as soon as this condition is corrected the inflammatory conditions of the pericementum are greatly relieved. Local treatment is necessary, but this alone is not sufficient; we must strike deeper and correct the morbid condition of the system if we hope to effect a cure.

Other cases might be cited that would seem to further substantiate the opinions already expressed, but time will not permit. I trust, however, the matter has been so presented as to stimulate further investigation into this subject, and I believe if your observations are carefully made you will agree with me that the facts and opinions presented warrant the supposition that gout and rheumatism are important factors in the production of a considerable variety of irritative conditions of the peridental membrane.

NO. 7 JACKSON STREET, CHICAGO.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, June 16, 1891, at the New York Academy of Medicine, No. 17 West Forty-third Street, New York City.

The President, Dr. William H. Dwinelle, in the chair.

REPORT OF COMMITTEE ON THE DEATH OF DR. EDWARD MAYNARD.

Your committee appointed to draft resolutions in regard to the death of Dr. Edward Maynard beg leave to report the following:

Since our last meeting, following up the death record which has been so appalling of late, an honored member of our profession, a distinguished citizen and man of the world, has taken his departure from our midst. We refer to Dr. Edward Maynard, who died in Washington, May 4, 1891.

Dr. Maynard's relation to our profession was a peculiar one. He may be considered, as far as this country is concerned, to be one of its founders. His early associates were Drs. Hayden Harris, the Parmlys, Solyman Brown, Elisha Townsend, and the noble army of worthies of that day. He was one of the editors of the *American Journal of Dental Science* in 1844, and occupied the chair of Theory and Practice in the Baltimore College of Dental Surgery in 1857.

In consideration of his contributions to science and art he received honorary degrees from various institutions abroad, and diplomas of merit from our most distinguished seats of learning. His reputation as an inventor extends throughout the civilized world.

He was appointed as a cadet at West Point by De Witt Clinton, but resigned a year after on account of ill health. He then gave his attention to civil engineering, anatomy, architecture, drawing, and such mechanical employments as would best educate his hand for the profession of dentistry, which he finally adopted in 1835.

By invitation of the Hon. Secretary of War, Dr. Maynard was one of the gentlemen who attended the examination of the cadets of the Military Academy at West Point, in June, 1863, and was nearly successful in his endeavor to have a Dental Corps attached to the army and navy, justly considering the care of the teeth of officers and soldiers of paramount importance.

He was a many-sided man, and was an expert in regard to whatever passed through his hands, as attested by the varied instruments that came from his inventive mind, whether for the dentist, the surgeon, or for the world's service at large, as exemplified by his rifle, which has made him famous even beyond the bounds of civilization.

He embraced many departments of art, and made them all tributary to our profession. He gave an air of finish, of grace and beauty, to all his productions, and put the stamp of excellence upon everything that passed through his hands. Honors so abundantly bestowed upon him he laid as trophies at our feet, and was proud to do so.

He was an expert in wood-engraving, many specimens of which are still in existence. In wood-carving he showed great ability. Some of his earlier efforts in modelling in clay gave great promise

in this direction. In drawing and color he was particularly happy. No architectural drawings could exceed his in correctness, in detail and finish; they reminded one of the best efforts of the most accomplished experts.

He was a member of the celebrated Sketch Club at Washington, where he, with others, spent evenings sketching from the nude.

For many years, like Washington, he was a surveyor, and some of our most important public works attest his skill and direction.

He was employed by our government to make the first experiments, in conjunction with the authorities in Belgium, in regard to the manufacture of Damascus steel.

All of his models, his inventions in guns, his medals and decorations, are deposited in the National Museum at Washington, in cases especially set apart for them, for the purpose of showing everything in the line of fire-arms of his invention from the earliest to his latest.

We have mentioned these things thus in detail to show that reflectively they redound to the honor and glory of our profession, to which he was so much attached.

Modest, retiring almost to diffidence, delicate and refined even to the graces of womanhood, Dr. Maynard presents to us a character for our contemplation such as we cannot expect to meet again. He has placed us under such obligations to him that no time can obliterate, and we desire to put on record our sense of that obligation and of our great loss.

Dr. Maynard has two sons now living in this city,—George W. Maynard, an artist of eminence, and John D. Maynard, who follows the profession of his distinguished father.

Resolved, That a copy of these resolutions be published in the proceedings of this Society, and that a copy of them be sent to the surviving family of Dr. Maynard.

WILLIAM H. DWINELLE,
S. G. PERRY,
C. E. FRANCIS,
BENJAMIN LORD,

Committee.

Dr. Remington.—I move that the report just read be spread in full upon a memorial page of our minute-book, and that a copy of the report be sent to the family of the deceased.

Motion seconded and carried.

The President.—Gentlemen, I have the pleasure of introducing

to you as our essayist for this evening, Horatio C. Meriam, D.M.D., of Salem, Mass., who will now address us.

(For Dr. Meriam's paper, see page 617.)

The President.—Gentlemen, Dr. Meriam's very interesting and practical essay is before you for discussion. I hope you will all speak upon it. x

DISCUSSION.

Dr. S. E. Davenport.—I remember being particularly enthusiastic over Dr. Meriam a few years ago. He favored us with a few remarks in discussion of a paper which was both interesting and valuable, and those remarks pleased us all so much that at the close of the meeting I was impertinent enough to say to Dr. Meriam that I thought his extemporaneous remarks were even better than his writings. I thought I was paying him a very great compliment. Since hearing his paper to-night, and the previous one from his pen, I feel that I must apologize to him, and say that his writings are quite equal now to his extemporaneous remarks.

It is well known that no matter how barbarous a country may be, if visited by Christian missionaries not only are souls saved, but the practical side of life is looked after by the inhabitants of that country in a much better manner; the people keep cleaner and transact their business with more energy than they did before the missionary's visit.

I look upon Dr. Meriam as our own bright, special missionary. He keeps coming, and every time he comes there is a radiance,—we see the sign of it when he takes the position back of the essayist's desk,—there is a halo about him which does not come altogether from the dinner just eaten, and I feel that he is elevating these New Yorkers,—and we all need it,—he is increasing the dignity of our profession.

His work is certainly arduous. It is freely given,—done entirely for the love of it; and I wish to express my individual obligation to him, and to say that, if left to ourselves, we might possibly continue to make very fair fillings, but at the end of the day we would not feel that our mission had been such a high one after all, as we may if we accept Dr. Meriam's estimate of our work, and his idea of what we can make of our specialty.

Dr. J. Morgan Howe.—I feel very much in accord with the sentiments that have been offered by my friend, Dr. Davenport, in the view he takes of the missionary character of the visits that Dr. Meriam makes to us, and the missionary effect that they have on us.

I really think that we are in a sense cleaner, ethically, than we used to be; that we live on a little higher plane than we did at one time, and I look hopefully to the future.

There is very much in what Dr. Meriam has said that concerns us practically. The time is too short to refer to all, but some of the points to which he just referred appear to me to be very suggestive, in that so little has yet been done by dentists to increase the knowledge among dentists of the materials which we use in our practice. We really know very little of the materials which we use; we have, to a great extent, left this matter in the hands of dealers and manufacturers who have served us with what they chose.

It has appeared to me, and it is a suggestion that comes very naturally out of Dr. Meriam's remarks to-night, that societies could be engaged in no better work, through committees and otherwise, than in endeavoring to fix upon the constituents of alloys which would be best calculated to serve our purpose, which would be best worthy of our experimental uses, and cements which may offer opportunities for improvement, if a study of them were entered upon in conjunction with chemists, and with manufacturers, some of whom undoubtedly would be willing to co-operate with societies in such labors.

Very many of the materials might be improved, and some which we do not use might be brought into use, by such efforts as these. The resources of, and relations to, all the learning and all the science of the world that we have at our call and demand are very great; but as yet our demands have been almost nothing. We have not reached up for what the world of science has to offer us, and in this particular direction alone Dr. Meriam's paper contains a great deal of very valuable suggestion, which I hope we may in the future act on from a practical point of view.

The President.—Applying the suggestions made by Dr. Meriam's excellent paper to the larger experience of Dr. Lord, I think he is ready to give us some hints that will be of value to us.

Dr. Lord.—Mr. President, I think it very doubtful whether I shall be able to say much that will be edifying.

I do not think I know much, and, as I grow older and have more experience, I feel that I know less.

I have often been led to wish that I had spent more of my life in study and in investigation, that I might the better understand the true relation of things and their intrinsic value, and less in actual work with my hands.

No professional man—indeed, this may be said of men in every

department of life in this most active and progressive age—can wholly depend upon his experience, however extensive it may have been. Every one should be a student as well as a practical worker, if he would be thoroughly furnished for his work.

It can be said that the practice of the art of dentistry is made up, in a great measure, of most careful and exact manipulations, but there are great principles—the principles of physiology and pathology—which underlie the application of the art, and these must receive all due attention if we would hope to cover the ground as well as we ought to.

The possibilities of our calling, which, as I understand it, is one of the leading thoughts of the paper, are as yet by no means reached or understood—perhaps hardly even entered upon—by the profession at large.

We know altogether too little of the materials and medicaments that we use, particularly those of a compound character.

Take, for example, the alloys we use, and how little we know of their composition, or whether the formulas will give us the very best alloy that can be made. Then, if the formula is all right, how very seldom can we be sure that the different metals had been refined and were pure before they are melted together.

Then, again, if I understand it, the formula may be destroyed, at least in a measure, unless the melting of the metals is done with the greatest care, by the burning away of some portion of the softer metals.

We are altogether too dependent upon the manufacturers of the materials that we use, and this may be said also of our instruments; not that we can manufacture for ourselves, but we should be able to tell what we want, and only employ such persons as will be sure to give us just what we order.

I think I am using, to-day, a better alloy than I ever used before. I recommended it to a friend, who asked me the price, and when I told him three dollars he remarked that the price was high and that he could make an alloy himself much cheaper.

Is there not altogether too great a disposition to use cheap or low-priced materials, and should we not consider that the best is the cheapest? If it required ten dollars an ounce to produce the very best alloy that could be made, we ought not to hesitate to give it.

It has been said, and no doubt with much truth, that there are prepared for our use too many or too great a variety of forms of gold. They are not needed, and are only more or less embarrassing, particularly to the younger men.

As has been said, they are prepared more in the interests of the manufacturers, and are no doubt often sold on account of the promising and extravagant manner in which they are advertised.

We should no more expect or allow the makers and venders of dental goods to tell us what we need and should use than the druggist should tell the physician the kind of remedies and drugs he should use in his practice.

Dr. S. G. Perry.—I admire New England; I have a great admiration for that rock, and for that ship which came over. It is said of New England that she was the cradle of liberty. Certainly slavery was wiped off the face of some of the earth through her efforts.

There is a certain ruggedness about the character of her sons that I always admire. Perhaps it comes from tilling her rocky soil, from fighting the Indians in the early days, or from eluding the malaria that was said to infest her valleys. She had always manifested a desire for liberty, and the same spirit is shown in Dr. Meriam's paper to-night. There is an undercurrent of meaning in it that suggests a great deal. There is also a foreshadowing of the individual duty of men who enter a profession, a sort of moral obligation that rests upon any one who enters a liberal profession like ours.

Is life worth living if we cannot feel and manifest an interest in the profession we have chosen? It may be doubtful if it is worth while to struggle through life unless we can have a little of the feeling that, though we work modestly and quietly, our efforts shall yet be a benefit in some way, and that we shall reflect some credit on the profession.

I was profoundly impressed with what Dr. Dwinelle read to-night in reference to Dr. Maynard. What a life was that! What an inspiration it ought to be to every man in this room, to think of the ability of that man and the devotion he showed to his calling! If our point of observation is right, this world is worth living in, and there is something to live for. That which has been greatest and best in this country has, for the most part, had its origin in New England, and I think we are under obligations to our friend for coming down here in his missionary work.

Dr. C. E. Francis.—Mr. President, although a New Englander, I do not feel that I can add anything of interest to what has already been said this evening. I believe that not only dentists, but all people, as a rule, are better off for having a broad and generous knowledge of things in general. It is well for dentists to

be able to do very many things, but I sometimes doubt if a man can be eminent in any one branch or specialty of science or art and still figure as a "jack-at-all-trades." It is right that dentists should know how to make alloys, instruments, etc., yet it seems to me that operative dentists of the present period can employ their time and talent to better advantage in other ways than in doing these things.

In my early days I melted and prepared my gold plate and solder and shaped my instruments, but do not feel inclined to do so at the present time. I prefer to have manufacturers who make a specialty of such work do these things for me. They can do them better than I can, and this leaves me more time for other duties.

The President.—I would call on Dr. Brockway, as a representative from Brooklyn.

Dr. Brockway.—Mr. President, there are more worthy members from Brooklyn present than myself, but while I am on my feet I will take occasion to express my gratification at Dr. Meriam's paper, which I have listened to, as I always do to his efforts, with extreme satisfaction. I recognize that the New England spirit, of which this paper is an exponent, is something that goes back of New England itself. That is, it is a spirit of independence, and of seeking after truth and liberty, and I am sure that that spirit cannot fail to be of advantage to any profession which adopts it.

I was impressed somewhat with the remarks of Dr. Lord, that if he had his life to live over again he would devote less time to matters of detail and practice, and give more time to an investigation of the causes of things, and why certain combinations of materials are better adapted for the case in hand than others. You all know the old proverb,—“Happy is the man who understands the causes of things!”

If we could understand the causes of things, we should save ourselves a vast amount of discomfort and anxiety, and would be able to give our patients the benefit of exact knowledge, where usually we are only able to give them the benefit of mere assumptions. I never listen to Dr. Meriam without feeling encouraged and stimulated to better effort; he makes me feel that I am better qualified to cope with the difficulties that I encounter than I would have been, had I not heard him.

Dr. Farrar.—When I came here I had no thought that I would be called upon to speak, but as long as I have been, I will say that I have been much interested in the paper, and believe in its teachings, heart and soul. We all, as dentists, work too much like bees

who carry their honey to hive, for man to draw out. We should have more independence of thought and of action; we should know where to get the best of things that we need, at reasonable prices, and we should spread that information broadcast. I long to see the time come when dentists will be able to lay aside a little more money out of their hard earnings, and not be obliged to live the life of property bees.

There are no professional men who work harder than dentists, and while they all enjoy the calling, if they are qualified by nature and education to practise it properly, they should enjoy a larger measure of the "sweets," as it were, as a reward for their hard work. Nothing would please me more than to see the spirit shown in this paper carried out by the profession. I mean the spirit of a fight for freedom, and independence from bondage of any kind, and if I see rightly, this spirit is already aroused "all along the line." If this be true, then sooner or later dentists will be placed in circumstances which will enable them to enjoy that which the merchant enjoys from his labors.

Dr. E. A. Bogue.—It seems that those heathen nations that were alluded to to-night not only become that much better, as has been mentioned, upon the reception of civilizing and Christianizing truths, but their pecuniary condition, due to careful trading on those same principles, is improved. Hence I think we may take some encouragement to ourselves that the moment we can adopt a higher principle, that moment may be counted upon as improving us pecuniarily, as well as professionally.

Dr. Meriam has certainly struck within the breasts of the members of this Society a responsive chord. It is not necessary to tell him again that we are learning more and more to sympathize with him in the views he has advanced this evening; but as in our younger days we used to take the opposite side of a question simply for the sake of carrying on a discussion, I beg his permission to take the opposite side just now; and the reason is that in making application as one of the members of your executive committee to a gentleman for a paper to be read before this Society, I was met with almost a prompt refusal, on the ground that papers read here would not be published in the *Dental Cosmos*. I undertook to argue the gentleman out of his decision, but was met by the strong argument that the *Dental Cosmos* had attained a position that made it the most widely read of all the dental journals; if he had taken the trouble to get up a good article, he wished it to be read as widely as possible.

I should like Dr. Meriam to answer all these numerous remarks,

and should like to have him tell us why this gentleman is not right. The gentleman referred to says he is not yet fully established, he is not fully known in the dental profession. He has taken a great deal of pains with the papers he has already written, and he wishes his reputation to be more widely extended, and for that reason he wishes the *Dental Cosmos* to publish his article. He would be very glad to bring his paper before the New York Odontological Society, and so long as we adopted the *Dental Cosmos* as our mouthpiece he did give us something.

Now comes the question: Are we sufficiently strong to fight our own battles? Are we yet able to take the position as an independent profession, or an independent speciality, if you please, casting aside personal self-interests and laboring for the good of others? Because if we have really, in the moments or hours of relaxation, or even of work, discovered some of the laws of Nature, or discovered some of their applications, it is our privilege as honorable men, as well as beneficent men, to spread that knowledge as widely as possible, so that if there are any truths in it they may be extended to others.

Mr. President.—I am sure we would like to hear from Dr. Carr.

Dr. William Carr.—*Mr. President,* I was very much pleased with the essay and can heartily endorse it. We often use drugs and materials without any knowledge of their composition or of their action, relying solely upon the statements of the chemist or the manufacturer. This course often results in disappointment and failure. I think that the time has arrived when a society like the Odontological should be divided into sections, and that special subjects should be assigned to each section for investigation, allowing ample time in which to report. For instance, the subject upon which Dr. Lord has just spoken—"The Alloys"—is of great importance to every practitioner. I do not agree with Dr. Francis that he has no time to investigate alloys. I should be willing to give my evenings for the greater part of a year if I could thereby solve the amalgam problem.

Yesterday a patient who was formerly in Dr. Bronson's care came to me for treatment. Of eleven copper amalgam fillings, four were complete failures, and I believe that the rest of them will preserve the patient's teeth indefinitely. We all know what a painstaking and conscientious operator Dr. Bronson was. Why were four of these fillings failures? Was it Dr. Bronson's fault? In preparing the amalgam, did he overheat it? Did he squeeze out too much mercury, or leave too much in?

If some one would investigate the subject and give us a perfect amalgam, it would prove a great blessing to humanity. The price should not enter into the question at all. I will give to-day fifty dollars an ounce for a copper amalgam that will work perfectly. Give me an amalgam that I can rely upon, and that will preserve the teeth of my patients.

Of course, as I am not doing missionary work like my friend Davenport, I get compensation for my services; so if I gave fifty dollars an ounce for the amalgam, I should expect to be compensated accordingly.

Dr. J. F. P. Hodson.—I heartily endorse all that Dr. Meriam has said, and I have been very much delighted with his essay. In respect to some things that have been said by others, I should take some exception.

I cannot believe with them that, in a specialty like ours, involving in the vast majority of operations so much of the very refinement of mechanics, and so much of positive manual dexterity in their application, an education in the mechanic arts is so non-essential. On the contrary, I feel that the usual operations of the purely "medical" dentist show him to have woefully mistaken his avocation. I was educated originally by Dr. Westcott, and one of the prerequisites for graduation from that institution was that every man should make a complete set of his own instruments from the crude materials in addition to the usual laboratory training. I gained thereby a knowledge of the manipulation of metal that has stood me in good stead ever since. It gave me a power of resource and strength of foundation that no theoretical education could take the place of in making special instruments; judging instruments and knowing the good from the bad; making all sorts of alloys, and, indeed, all of those things that are of the practically educational; but I think they were only educational, and that is the especial point I wish to make. I cannot find that one can go on and do these things any more than a physician can go on and manufacture his own medicines or a ship's captain make a business of going aloft to furl sail; his time can be employed to infinitely better advantage, but, with his thorough training in every detail, he is master of his surroundings in a very real sense.

Dr. Horatio C. Meriam.—I need not speak of the gratification I feel at the cordial reception you have given my address. I wish, however, to disavow for myself the compliments that were so kindly given, and ask you to esteem me as a follower of what I see should be followed. In the results that come the individual may

be nothing. He may be lost in the greatness of some cause he has aided.

The position taken by Drs. Carr and Hodson on the educational importance of the study of these questions and the resulting practical value to us will, I am sure, be found important in the future. In the discussion of alloys, or anything made from a known formula, we shall secure those that, by being taught to others, can be perpetuated, and the discussion on their value will be a mine of information for the future pharmacist. As matters are now, the alloy we use and find good may be changed or cheapened, and we change backward to some former formula unknown, or forward to a new one equally unknown. If the discussion of amalgam in this Society some years since had been on alloys of known composition, it would have added much to that which could be taught, and when in that form they can properly be called "professional," because they cannot be controlled by parties outside our specialty.

The price of articles we use has been mentioned; we pay enough to command the best service. In open making, material and skill in making are charged for, but in a Trust or Combination the price is fixed at "what it will bear." I was told not long since that prices on new things were fixed not by the cost of production, but by the price of a similar article, and that the price of articles similar to those patented was fixed so as to cover the price paid for the patent, that the contrast in price might not be seen. So you see the importance of having articles made outside the combination. We know nothing of the real value of secret preparation; the "ten dollar per ounce alloy" may bear no relation to its cost, the price being made by the fiat of its maker.

I was glad to hear Dr. Hodson refer to the knowledge gained from a training in making alloys, and that physicians did not make their own medicine. Probably very few in full practice study the composition of drugs; but no one has a right to hinder another's investigations and claim to be professional, and no pharmacist or instrument maker undertakes to direct what the physician shall use.

I will try now to reply to Dr. Bogue's question. A representative of one of the Combination journals said to me, in substance, "We do not mean to have dentistry united with anything else; we do not mean to have dental things around in drug-stores or in the shops of dealers in scientific and surgical instruments, etc., but to keep it separate, virtually committing our specialty to isolation from all the other arts and sciences of the world." I do not see how

they can take any other position and keep up the Combination. If they control a thing, advertise it; if not, keep it out of the journals, though the government in its postal regulations requires a publisher to make oath that the advertising pages of his journal are open to all firms and dealers.

Do we want journals that represent us, or trade? A librarian who was familiar with some of our trade journals said to me that if it were not for the aid given them by dentists, they would have to be thrown around, like Ayer's Almanac. Now, why should not the gentleman who wishes a large circle of readers publish his paper in Ayer's Almanac? It is fully illustrated, well edited, has a large circulation, has a large capital behind it, its future is assured. The answer is that it is not an authority in medical science, but represents Ayer & Co. We wish to build up a journal that will represent all sides and relations of our specialty, and one that in libraries and by exchanges may be looked on as representing it, and which cannot be suspected of owing other allegiance or representing other interests. When we have done this, our friend will find that his paper, by the reference that it would gain from contemporaneous papers and literature, would gain a larger and more valuable circulation than it is possible for it to receive in journals aiding the isolation of our specialty.

Dr. E. A. Bogue.—Mr. President, if you will kindly bear with me a little while, I would like to ask Dr. Meriam another question or two.

What argument is to be offered to these gentlemen, some of them graduates in medicine, all graduates in dentistry, and well-known to us as earnest workers,—what arguments are to be offered to them to induce them to publish their articles in a paper of very limited circulation, as they may tell us? How can we induce them to join with us in the fight for professional independence, which will enable us to say "Go here, go there, go yonder for what you want." Take any of the journals that are known as proprietary journals. Dr. Meriam mentions Ayer's Almanac; well, Ayer's Almanac is a good thing for certain purposes. Why should we not publish our proceedings there? Probably it would be more widely read than even the *Dental Cosmos*.

I should, for my part, like an argument to be put into my mouth, which I may lay boldly before these gentlemen, and receive their answers. May I beg Dr. Meriam to give us a reply?

Dr. Meriam.—It seems to me that a man strives for what he likes best; that if one really prefers a dollar to professional repu-

tation, there is no argument. This covers a point that perhaps ought to have been in my paper, which is that the spirit of appreciation would probably come if we saw these things around us and in our literature. Many feel they get no thanks whatever for doing original work.

We are not asking, as I understand it now, for more money; we are not asking for more money from the community for ourselves, but we are protesting against the isolation of a specialty of medicine, and the question comes up again, Are these journals tending to produce this isolation of our specialty, or are they aiding to establish its correlation?

Dr. Remington.—I would move that the Society show its appreciation to Dr. Meriam by a vote of thanks.

Seconded and carried unanimously.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.
Editor New York Odontological Society.

AMERICAN MEDICAL ASSOCIATION.

Wednesday, May 6, 1891.—Morning Session.

SECTION OF ORAL AND DENTAL SURGERY.

(Continued from page 631.)

DR. GEORGE W. WHITEFIELD read a paper on "Pathological Conditions produced by Galvanic Action between Dissimilar Metals in the Treatment of Caries of the Teeth," and then illustrated some of the points in his paper by an exhibition of electrical apparatus.

(For Dr. Whitefield's paper, see page 671.)

Dr. Williams.—In this experiment one element is amalgam. What is the composition of that amalgam?

Dr. Whitefield.—Ordinary commercial amalgam. I don't remember its composition.

Dr. Williams.—One point that I can see in this paper is that what we have practised can be verified by strict scientific experiments. I will simply say one or two words. I have noticed from general observation, and am convinced, that amalgam with zinc is more liable to produce galvanic action than without zinc.

Another point is that in several cases where there has been decided galvanic action, I have found that the galvanic action was less, or not existing at all, by combining as large a proportion of gold-foil with the amalgam, as possible. It is on the theory in a general way that by mixing the gold with the amalgam, if there is gold filling near, it lessens the difference in conductivity between the metals and so lessens the galvanic action; that is my theory, practised for years.

Dr. Marshall.—I am interested in this paper and also in the experiments, and have this to say of some experiments I have seen. Dr. S. P. Palmer, of Syracuse, New York, demonstrated fifteen years ago, or rather, I should say, proved very conclusively, that there was not only action between tooth-structure and metal fillings, gold and amalgam plugs, but also between gold and tin and between tin and amalgam, but of course the action was not so great between the latter as between gold and amalgam. He also went considerably further than this in his experiments. He proved conclusively that a galvanic action was established between any two dissimilar materials when moistened with a solution of chloride of sodium, or saliva, producing a distinct deflection of the needle of the galvanometer. Another experiment seemed very strange at the time; for instance, he was in the habit of taking two foods which we eat in pairs, as the most palatable, such as ham and fried eggs, a piece of mutton and tomato sauce, a piece of turkey and cranberry sauce; in fact, he followed it all through the foods which we naturally eat in pairs, and found that by moistening these with saliva that there was a deflection of the needle as a result. He then made this suggestion, that on account of this peculiar galvanic or electrical action present between certain dissimilar bodies or kinds of food, zest of taste or relish is given by the decomposition of the saliva, produced by the electrical action between the foods.

“How many of us ever tasted water as good as that of the well on the old farm?” Dr. Palmer would ask. “What did you drink out of, the tin dipper? The contact of the metal dipper with the moist lip produces a galvanic current. That is the solution of it.” I am inclined to think that there is a good deal in this. I just mentioned this to show what has been done experimentally in this very direction by Dr. Palmer. Most of you know that Drs. Palmer, Flagg, and Chase were the three men who made up the new-departure trio. Their idea was that gold was not always the best material to use in the filling of teeth; that sometimes amalgam was better than gold itself, on account of the low galvanic condition which

existed between amalgam and some of the baser metals and tooth-structure.

Dr. Williams.—There is one point in regard to Dr. Palmer's idea that I would mention which I think is a little wanting, because I consider as a general thing, and certainly the poet so mentions it, that the most delicious flavor of water is from an old oaken bucket.

Dr. Marshall.—Dr. Palmer in his experiments also proved that just as soon as the surface of the amalgam plug became thoroughly oxidized, electrical action ceased. It was only in such cases in which the plug remained bright that this action continued. You all have no doubt noticed that when an amalgam plug has been placed in the tooth in contact with a gold plug, in a few days oxidation commences; and it used to be thought that we must leave a bridge or partition of dentine or tooth-structure between the two plugs, but we found after a time that the tooth at the cervical margins of the plugs was very soon dissolved away, and that when you allow them to come in contact this condition did not occur.

Dr. Custer.—I think you might gather from this that the amalgam which oxidizes most easily will be the best.

Dr. Whitefield.—I made a statement that where amalgams oxidize rapidly they are best; zinc will never oxidize thoroughly. I will state the following case: A patient came to me for treatment, and while under my care she complained that the fillings that had just been inserted were giving trouble. It immediately called my attention to the electrical action. I removed the amalgam filling and in a short time all the trouble stopped. Using amalgam in preference to gold in some cases has been suggested. In some cases they need a kind of whip. There needs to be some kind of a stimulant.

Dr. Williams.—I would like to say that I hope that Dr. Whitefield will try a suggestion of mine, which is to mix as much gold as possible and then put it under test. I hope he will try it practically, scientifically, and mathematically; not try to find a certain thing, but try to see what he can find.

Dr. Marshall's paper was next read. (See page 690.)

Dr. Williams.—Mr. Chairman, I have a few words to say, and that is that this paper seems to me to be a very sound and rational paper in every respect. There is a point of originality in the cause of the accretions which it strikes me is quite new. Another point that I fully concur in is that the local treatment, whether by ploughing with instruments or by application of various medicaments, will not produce the preventive action we want.

Dr. Noble.—I was very much interested in one or two points in the paper, and one was the source of this deposit that we find frequently in these deep-seated troubles. I know that we want to seek for something besides a local cause. I was very glad to see a proof of Dr. Marshall's ability in that direction. I have not much to say, because this is rather a new thought to me in looking for these troubles; but I shall in the future try to observe some facts suggested by Dr. Marshall's paper. I have not the slightest doubt but they are derived from correct observation. I think we must look to the system far more than we have in general treatment. It is rather in the general system than in local causes that we should expect to find many of the most marked and deep-seated troubles. I rejoice to see a paper with the perfection with which this was placed before us, and shall read its publication with a great deal of interest, and try to see if the statements made by Dr. Marshall cannot be verified by observation in my own practice.

Dr. Whitefield.—I would like to say a few words about a case that bears on this subject. I have in mind a patient who came to me seven years ago with almost perfect teeth, but her gums were highly lacerated. The explanation she gave was that she used to have a desire to probe her teeth continually, and thought that caused the trouble. At the time I did not understand how to treat her; but later on I found out the lady was suffering from a rheumatic diathesis, and every once in a while this would occur. As I knew her better, I now can recall that she would have this trouble about the time she would have the rheumatic trouble. She was past the middle period of life, and had almost perfectly sound teeth. She was very cleanly, and I never could find a particle of tartar about her teeth. I am therefore confident that Dr. Marshall's deductions are correct.

Dr. Daniels.—I would not attempt to discuss a paper like this without some preparation. I certainly think that in all of these papers there ought to be some time allowed for criticism. I have no doubt that Dr. Marshall has given a great deal of thought to it that will lead in the right direction, and we will learn more about the manner of investigating this very serious trouble. I would like to hear others on the same subject.

Dr. Taft.—Gentlemen, I have had a great many ideas on this subject in my time, some of which proved afterwards to be not very good. In reference to these particular deposits upon the root of the tooth, in connection with the suppuration that takes place between the root of the tooth and its surrounding tissue in the disease of the peri-

osteum, or tissue surrounding the cementum, it is found in various forms, as you all know. Sometimes it is more dense than ordinarily. Sometimes there is a considerable amount, in thick clumps, and in some cases largely distributed over the roots of the teeth. I think it is always of a darker color than ordinary salivary calculus. There are a great many varieties, and it will be interesting to follow them out and the paper leading in that direction. It would be an interesting question to decide fully by induction the action of these various presentations of this trouble. The deposit is sometimes very rough on its surface, in other instances quite smooth. However it may be in these respects, it presents a surface to which the tissue can never unite, and while it remains there will necessarily be a diseased condition. That it comes from the saliva there is no evidence whatever, as indicated in the paper. It was formerly assumed by many that it occurs in the same way that ordinary salivary calculus does; but there are so many counter-indications that this theory cannot be considered as correct, and we must look for the trouble elsewhere. I have no doubt this material is a deposit from the blood. Where this disease takes place, how this disease begins, perhaps, is not so easily explained; that is, how the disease occurs in connection with this condition of affairs. As a matter of course, there must be an irritant in the part before any deposit takes place; that this deposit is a primary thing in this respect I do not believe. I think it is a consequence of the diseased condition that existed before any deposit at all was formed. What is the irritant or cause of this disturbance in the first place I will not now pretend to say,—only that it is at first a point of deposit, a point upon which vicious matter is retained, that becomes more and more vicious as it remains. Dead material that comes into such a pocket or space will be more likely to be retained on this roughened surface. It occupies the place that living tissue ought to occupy, and then again where it is rough, and sometimes it is found very rough, it consists of little nodules all over the surface. Allowing the tissue to come in contact with it will create irritation. There will be irritation induced by pressure against it, and when there is a rush of blood to the part an enlargement of the vessels in the immediate vicinity thus occurs. This sensation has been referred to by Dr. Marshall that persons desirous of assuaging pain will do so by pressure upon the teeth and that will give relief. By pressure it relieves the distended vessels, and then by letting up again there is a sense of relief.

Well, then, the question occurs, what shall be done? Mere sys-

temic treatment will not do. I do not believe that after this deposit has been made upon the roots of the teeth that it can be removed by systemic treatment. It is true that the system is in a bad condition and may be improved, and whatever may be done in that respect increases the tone and strength, and often relieves the system of embarrassment of this kind, although it will not remove this particular deposit. It is sometimes confined to the end of the root, and there may be very little of a pocket. Sometimes it may be found on teeth on one side, sometimes at the end; in molar teeth it is often in the bifurcation of the roots. Its frequent point of deposit in such locations render it exceedingly difficult to remove, as this material does not readily dissolve by solvents; that is, where there is a large mass of it, it is not easily dissolved. In testing the solubility of this material in sulphuric acid it does not quickly dissolve; so that what should be done with it is a question that is difficult of solution. If there is a pocket running down, it may be removed with a fine chisel-shaped scaler; but what shall be done when there is no pocket, when there is not a large space around the edge of the root? I have, not long since, seen superior molars removed with three well-defined roots, in which at the bifurcation there were large masses of this material. In a case of mine, where the patient was exceedingly anxious to save the tooth, which we always try to do when we can, he had given it treatment both surgically and with applications, but the tooth had to be taken out. Upon the outside of the roots, where they could be reached with a scaling instrument, they were in good condition, but where the surfaces were inaccessible by the instrument, sulphuric acid had been used, but with very little effect. Now, a case of this kind is very difficult to manage.

Another point is, What shall be done in the way of prophylaxis, before any disease has taken place? Can any treatment be employed before other disease commences? Are there any indications, are there any symptoms in the beginning that will aid you, and for which remedial or preventive treatment may be employed? These are points to which attention ought to be given and which we ought to study as thoroughly as possible in order to attain to an effective treatment or management of such cases. When we speak of prophylaxis, I suppose we speak of management of the body in such a way as to divert or prevent disease. What can be done to prevent this, and when that is ascertained what treatment may be employed to prevent or cure this condition? I fancy that we do not sufficiently understand the beginning of diseases of the teeth,

and that therefore our prophylactic treatment and suggestions with reference to prophylaxis is quite below what it ought to be, and what it ought to be for the best interest of patients. What light ought we to have on this subject?

Dr. Whitefield.—It seems to me that the value of Dr. Marshall's paper is that it does not point out treatment except in a general way. The question we ought to know is whether persons with rheumatic diathesis are more liable to have trouble.

Dr. Marshall.—Mr. President, I purposely avoided in my paper any reference to a special method of treatment. My idea was to present a paper on the pathology of the condition; and of course, as the title of my paper indicates, I confined it to the rheumatic and gouty diathesis as manifested in diseases of the peridental membrane. In reply to Dr. Whitefield's question, I may say that I have never noticed any difference between living and dead teeth so far as these particular manifestations in the peridental membrane are concerned. The remarks of Dr. Taft deal very largely with the point brought out in the paper with regard to location of concretions on the teeth and their character. Dr. Noble asked a question which I do not think was fully understood: whether these concretions were found at the apex, or upon the root of the tooth where there was no external opening at the margin of the gum, which proves, I think, my position. I claim such conditions exist as a result of rheumatism and gout,—viz., that the concretions are not of salivary origin. The issue I take with Dr. Ingersoll is that these deposits are not necessarily the result of suppuration, or that lime-salts are deposited as the result of inflammatory conditions. I claim, on the other hand, that the concretions just referred to are the results of a rheumatic or gouty diathesis, and are deposited upon the cementum through the agency of the pericementum, just as concretions are deposited in the synovial membrane in rheumatic arthritis. I have never seen a case which I classify as rheumatic without finding concretions present; but phagedenic pericementitis is not always the result of a rheumatic or gouty diathesis. You will find a great many cases of phagedenic pericementitis in which the roots of the teeth are perfectly clean. To illustrate, and I mentioned this in a discussion some years ago before the American Dental Association at Minneapolis, phagedenic pericementitis is often the direct result of peculiar neurotic conditions of the system. I recall the first case of this character that came under my notice. When the patient came into my hands I tried to find concretions upon the roots of the teeth, but could find none, and I was at a loss

to explain the difficulty. I made up my mind, after careful study, that there was a neurotic condition, or at any rate a reflex nervous condition, that affected the general health, and suspected from certain symptoms that she was suffering from some uterine displacement, so sent her to a specialist with the request that he would thoroughly examine the case. He reported that she had an antiversion of the uterus, and replaced it; and in less than three months her mouth was well. All the treatment she had was an antiseptic mouth-wash and the replacement of the uterus by the specialist. I have noticed also other cases in which individuals suffering from diseased conditions of remote organs had this same affection of the teeth. Phagedenic pericementitis is often associated with Bright's disease and diabetes mellitus. Concretions upon the roots are, however, the most common cause that produces this condition of the pericementum.

Dr. Taft.—What is your opinion in regard to the presence of these secretions in inflammatory cases?

Dr. Marshall.—I claim the concretions are the cause of the inflammation; they are the result of the peculiar diathesis of the system, and not the result of the inflammatory action. We find in the synovial membranes that acid crystals are deposited there, and by their presence cause irritation. We sometimes find associated with these crystals the calcium salts; and the longer the disease has been running the more likely is it that we find this peculiar condition of the concretion; that is, the presence of lime-salts. I have not been able yet to demonstrate by chemical analysis whether or not the concretions upon the roots of the teeth are really made up of urate of soda and lime-salts. I hope some time to be able to make the analysis; and if I get hold of a case in which the teeth must be extracted, and am sure the disease is caused by this rheumatic diathesis, I shall submit it to the best chemist we have in Chicago with instructions to examine it thoroughly and report as to its composition. That is the only way to prove the theory that I have advanced.

Dr. Whitefield.—Do you not consider that there may be soreness long before actual deposition?

Dr. Marshall.—That is one of the general symptoms of this rheumatic or gouty condition of the system. You will find in scores of cases that the very first symptom of rheumatic trouble presented will be soreness of the teeth. In a great many cases they do not progress beyond the stage of congestion, which simply results in soreness and thickening of the membrane; a great

majority, however, of the chronic cases result in exostosis of the roots, and in enlargement of the epiphyseal ends of the long bones. The cases in which there are pus-pockets formed are comparatively small in comparison to those that result in periodical soreness of the teeth with thickening of the peridental membrane.

Dr. Williams.—I hope Dr. Marshall will report after he has made the experiments.

Dr. Marshall.—Another point I would like to mention is that in regard to the systemic treatment. I indicated in my paper that in a great number of these cases I analyzed the urine, and found that the uric acid was largely in excess. In a case of this kind I would say to my patient, you are living too high, my friend; you will have to cut off your wine and eat no more meat, but be a vegetarian; and just as I restricted him in these things his symptoms would improve. This class of cases are just as amenable to systemic treatment as the ordinary cases of inflammation of the joints. If you take it early enough you can control the symptoms, and it was this fact, as I mentioned in my paper, which led me up to the thought which I have presented with regard to the origin of many of these affections.

Dr. Whitefield.—The value of your paper lies in this last point. Here Dr. Taft read his paper on "Care of the Teeth."

Dr. Whitefield.—The subject treated of in Dr. Taft's paper is one that interests me very much. I have always thought that a man's position depends very much on the way he regards himself. A dentist may be what I may call a scavenger, or he may not, just as he pleases. I certainly would never do any of this kind of work. If a man comes to me with his mouth filthy, I tell him, in as delicate a manner as possible, to go home and cleanse his mouth; and if this is done rightly he will not take offence. I have seen cases where the mouth was so filthy that I would not handle it under any circumstances. I point out to them the harm they are doing their teeth by letting them get in that condition. I find in most cases that when such people come back they have their mouths in good condition; they have thought about what I said. I impress upon them this point, that if they will do their part I will do mine; otherwise I will not do their work. I charge good fees, and my patients expect to have good work done. If they follow my instructions my work will stand and will be a credit to me. I think this matter should be emphasized more than it is by every dentist.

Dr. Williams.—I am very glad that Dr. Taft read that paper, because he refers so strongly to the necessity of dental hygiene

and about the frequent neglect of dental hygiene. How often do we find teeth fail, even when well filled, because the general health of the mouth is neglected. Why is it? I think I can point out part of the reason why it is. It is because a man calls himself simply a dentist, and thinks that all he has to do is to attend to a particular tooth. The fact is that he ought to be qualified so as to take just as good care of the health of the mouth. We should be orists. That is the proper name for an educated practitioner. As Sir Morrell Mackenzie says, the mouth is the gate of life; we stand guard over that mouth, and not simply over the posts, or whatever you call them. We take charge of the whole mouth. If we have a pride in considering ourselves orists, I think we will naturally take a higher stand-point of vigilance than is generally adopted.

Dr. MacNaughton.—The university from which I have the honor of being graduated impressed on the students that we have the right and privilege to charge whatever we think our services are worth; one of these services is to cleanse the teeth perfectly. The perfect cleansing of the mouth of a patient often does them more good than anything we can do for them.

Dr. Whitefield.—I thoroughly agree with the lady. What I meant to say was, that where I could induce my patients to cleanse their mouths themselves I would do so.

Dr. Taft.—The conservation of the health of the mouth is a great matter; the preservation of it in the best possible condition to resist diseases of the tissue. The mouth is the territory of the orist; it is the territory which is committed to his care, and he must do whatever he can to promote its best interests, and he ought to be able to know and understand the conditions and whatever is necessary to improve them. It is vastly better to preserve teeth and the mouth in a state of health, usefulness, and comfort, than it is to restore them after the incursions of diseases; and this is just the point I make, that this matter is overlooked. You will often treat a tooth to secure a good condition for life perhaps, whereas, if neglected, ruin would ensue so far as the tooth is concerned. It is to arouse attention to this subject that I have prepared this paper.

Dr. Williams then gave a brief epitome of his paper, "Remarks on Incipient Necrosis and Caries," there not being time to read it; after which the session was adjourned *sine die*.

JOHN S. MARSHALL, M.D.,
Editor.

AMERICAN DENTAL ASSOCIATION.

THE Thirty-first Annual Meeting of the American Dental Association was held at Saratoga Springs, N. Y., August 4 to 7, 1891.

First Day.—Morning Session.

Meeting called to order at 11.10 A.M., with the President, Dr. A. W. Harlan, in the chair.

Amendment to the constitution which was offered last year by Dr. Cushing was then read, as follows: "To amend by striking out the entire Section 2 of Article 4 of the Constitution."

Amendment adopted.

REPORT OF THE PUBLICATION COMMITTEE.

The Publication Committee reported that in consequence of the S. S. White Dental Manufacturing Company having declined last year to publish the transactions, they were given to the *Dental Review*, of Chicago.

REPORT OF THE TREASURER.

Balance on hand, August 5, 1890	\$1368.74
From dues to date	1000.25
Total	\$2368.99
Disbursements	1175.00
Balance	\$1193.99

REPORT OF THE EXECUTIVE COMMITTEE.

Dr. Crouse, on behalf of the Executive Committee, offered the programme for the convention.

REPORTS OF COMMITTEES.

Report of Committee on Legislation and Appointment of Surgeons in the Army and Navy, read by Dr. Noble:

"The committee prepared a letter which was presented to the surgeon-general of the army and navy, as follows:

" "MARCH 27, 1891.

" "TO THE SURGEON-GENERAL OF THE UNITED STATES ARMY:

" "The undersigned committee was appointed by the American Dental Association, at its last meeting, to consider the feasibility of the appointment of dental surgeons in the army and navy. It is believed that the appointment of

dental surgeons in the army and navy would be the means of relieving much suffering, and saving the organs of mastication so necessary to health and comfort. This want is especially felt in our Western military stations by both men and officers, far away from any dental surgeon, often sending members of their families hundreds of miles to get the services of a dentist.

“ ‘ We should be pleased to have your opinion and advice on the above subject.

“ ‘ Very respectfully,

“ ‘ A. H. THOMPSON, D.D.S., *Chairman*, Topeka, Kansas ;

“ ‘ J. Y. CRAWFORD, M.D., D.D.S., Nashville, Tenn. ;

“ ‘ W. W. WALKER, M.D.S., D.D.S., New York City, N.Y. ;

“ ‘ C. N. PEIRCE, D.D.S., Philadelphia, Pa. ;

“ ‘ H. B. NOBLE, D.D.S., Washington, D.C.,

“ ‘ *Committee.*’

“ ‘ The letter was presented to the surgeon-general personally, with such statements of facts within our knowledge as were deemed important. The interview with the surgeon-general, Dr. Sutherland, was a very pleasant one. The following answer was received :

“ ‘ WAR DEPARTMENT, SURGEON-GENERAL’S OFFICE,

“ ‘ WASHINGTON, April 13, 1891.

“ ‘ TO THE GENTLEMEN OF THE COMMITTEE OF THE AMERICAN DENTAL ASSOCIATION :

“ ‘ GENTLEMEN,—I have the honor to acknowledge the receipt of your communication of March 27, 1891, in which you suggest the appointment of dental surgeons in the army and navy, and request my opinion and advice on the subject. I am not in a position to speak as regards the navy, but so far as the army is concerned, it is a matter which has been considered by the War Department on several occasions. So long as our army is distributed in small bodies over a vast extent of territory, and is actually in the field for a considerable part of the year, it is deemed impracticable to extend to it the benefits of skilled dental surgery, however desirable this might be on behalf of officers and men. Where troops are massed in garrison, as in a few instances, the military reservation is, as a rule, in the vicinity of some large city, where the services of dental surgeons can be obtained.

“ ‘ I am of the opinion also that the necessity for special dental service with the troops scattered over the West and South is less needful now than it was some years ago, for increased railroad facilities have brought the most remote posts within a few hours’ journey of some great city.

“ ‘ I have the honor to be, gentlemen,

“ ‘ Respectfully yours,

“ ‘ C. SUTHERLAND,

“ ‘ *Surgeon-General, U.S.A.*’

“ ‘ No response has been received from the surgeon-general of the navy, but the opinion was expressed that the need was growing

less each year. We should therefore not have the encouragement or favor of the medical men of the army and navy. In asking or seeking such legislation at the hands of Congress, for it would require special law (act of Congress), we should be likely to encounter opposition, as the questions of rank, pay, residence, etc., would have to be considered.

"The men are only enlisted for a definite term of service, and are not accepted unless the mouth, in the judgment of the medical examiner, is in good condition and has enough good teeth to serve through the term of enlistment. The materials used by a dental surgeon would be a fruitful source of trouble in the way of expense. Officers would be very likely to want all sorts of impracticable work, and their families included on the free list, until the position of dental surgeon to 'Uncle Sam' would be far from pleasant or agreeable, sought or accepted only by the 'lazzaroni' of the profession, and would not be likely to elevate our profession in the estimation of the medical profession."

REPORT ON LEGISLATION, BY DR. H. B. NOBLE.

"WASHINGTON, D. C.

"The subject of dental legislation is a broad and deep one, and it is by no means clear just what is the best plan to secure unity of action in the various States, and also have sound principle for a basis of dental laws.

"There seems to be a diversity of opinion as to the powers that should be granted to examining boards of the various States, and whether a diploma from a reputable college shall exempt the holder from an examination. The trouble seems to be as to who shall determine what is a reputable college, and to draw a line between, or designate, the good and the poor, the reputable and the disreputable. It seems but fair and just that a graduate should have some standing, and, as a rule, we do not believe that examining boards are as well calculated to determine the competency of candidates as an instructor or regular teacher, and we have thought perhaps this difficulty could be overcome by a committee from the examining board in each State being present at the college examination in the State, and, if such examination were satisfactory to the committee, to endorse the diplomas, and when so endorsed they shall exempt the holder from any further examination.

"We think no reputable college would object to the presence and assistance of such a committee to endorse their work. Would not such a committee act as a stimulant to good college work, and also

divide responsibility in the granting and rejecting of diplomas, and to disarm the charge of interested professors seeing how large a number they could graduate (that is sometimes heard of), and to make proficiency, rather than numbers, the standard of success in college work? A national committee selected from the National Association of Dental Examiners, might perhaps be better than a State committee, if such a committee could be appointed, for it is doubtful if competent national committees could be secured to serve without compensation.

"We believe in colleges and college work, and in the thoroughness of this must we look for the proper education, elevation, and growth of our profession. When their work has been properly done, let us endorse and encourage them by laws that will properly recognize their labor.

"By a national or State committee, working in harmony with our colleges, we shall best disarm the feeling of jealousy, or want of harmony, between college faculties and examining boards that has appeared at annual meetings of those two bodies and in various State societies.

"Let us, as an association, and as individuals, labor to harmonize the action of those bodies. In union there is strength! Can we not secure this union by a committee, either national or State, to assist in the examination of students? By such a union we should soon have harmony of action in our State laws. The National Association of Dental Faculties and the National Association of Dental Examiners have both performed a good and commendable work by securing a three-years' term of study and a more thorough and uniform system of examination of those who would enter our profession.

"When dental laws were first enacted, they did not contemplate the ignoring or supervision of a diploma from a reputable dental college; but the rapid increase of colleges and their competition for patronage soon brought doubt upon the thoroughness of the work of instruction in some of those schools, and to cast doubt upon a diploma as a test of fitness for practising our profession.

"It was then believed by many that the proper way to correct this was by giving power to examining boards to ignore all diplomas, which has been done in several States, thus reducing the reputable diploma from a good college to the level of the poorest, and casting a doubt upon all, which will soon be felt and acted upon outside of the United States.

"Is it not a better plan to seek to elevate and improve our colleges to the highest rank by recognizing their work when

properly done? Is it not better to give their students standing and recognition, making a diploma mean what it says, rather than degrading and ignoring it?

"Have not our colleges furnished the men for society organization and work? Have not their societies been the parents of dental legislation and examining boards? We think they should seek, rather than discard, their teaching and advice.

"College training is one of the foundation-stones of professional life. Another reason for making our diplomas stand for something is that we may move our residence, and not be subjected to an examination from committees every time a State line is crossed. Some of our most skilful and scientific operators could not pass a strict technical examination, such as is required of students. Old practitioners, and those who have creditably passed an examination by those qualified to conduct it, should not, we think, be required to go before an examining board every time they may change their location. This may be avoided by recognizing a diploma from a reputable dental college. This, of course, brings us back to the character and reputation or standing of a college, and we think this can best be ascertained by a national or State committee.

"It does not seem feasible to seek a national law, as each State would justly claim the right to construct its own laws; but great care should be taken, in framing those laws, that they may be legal and just, and not retroactive, as in the case of the New Hampshire law that was overdrawn.

"Dental legislation has had a very rapid growth,—possibly too great for a sound and healthy stock. We think a little pruning of some of our State laws is desirable, rather than stimulation of growth, thereby rendering them more uniform and strong, and better adapted to the wants of the profession and to any assaults that may be made upon them, for it would be strange if assaults were not made upon them by those who may seek to avoid or overthrow them.

"Let us then seek to unite and strengthen our forces by united action of State and national societies, and of colleges and examining boards. In harmony and union there is strength and success!

"We wish to call attention to the fact of there being no dental law in the District of Columbia, and that the senators and representatives from the States have the making of the laws for the district, and that all dentists throughout the United States will ask their senators and members to give their attention to the matter which has been so long neglected.

"Year after year have bills been brought in only to be laid aside, and we ask that every member of this Association give this matter his attention and assistance."

The report was adopted by the Association and directed to be published in the transactions.

The committee on the New Hampshire State Board case then presented their report.

"The undersigned, appointed as a committee under the resolution adopted last year to investigate the nature and status of the litigation in regard to the dental law of New Hampshire, with authority 'in their discretion to draw on the treasurer of this Association for an amount not to exceed five hundred dollars,' would respectfully report as follows:

"That the statement made to this Association last year was correct as to the dental law of New Hampshire, passed in 1879, having been declared unconstitutional by the Supreme Court of that State. That the statement was incorrect as to the reported appeal of the case to the Supreme Court of the United States. The fact is that the dentists of New Hampshire wisely accepted the decision of their own highest court, and instead of wasting their means by an appeal to the Supreme Court of the United States, they applied themselves successfully to the enactment of a new law which does not contain the unconstitutional provisions.

"From the decisions of the New Hampshire Supreme Court it will be seen that the old law made an unjust, frivolous, and ridiculous distinction between men of the same class, and was retroactive in its most objectionable form. The distinction was that a dentist who had resided and practised his profession in the town or city of his residence January 1, 1879, for all the four years preceding its enactment, could retain his right to practise; but another man who, although he may have been in reputable practice in the city for fifty years, had moved either his place of business or his residence within the four previous years, lost all his rights.

"Your committee decided that it had nothing to do under the resolution but to report as above.

"Respectfully submitted,

"L. D. SHEPARD.

"THOMAS FILLEBROWN.

"GEORGE H. CUSHING."

The following is the decision in regard to the New Hampshire Dental Law.

At the adjourned law term of the Supreme Court, opinions were given in the cases of *State vs. C. D. Hinman*, and *State vs. D. D. Pennoyer*, the former a dentist, and the latter a physician, who were indicted in Rockingham County for practising without a license. The opinion in the first case was given by Judge Clark as follows:

"This is an indictment under Chapter cxxxii., 'General Laws,' for practising dentistry without a dental degree or license. The respondent demurred upon the ground that the statute is unconstitutional.

"The object of the statute upon which the indictment is founded is to secure the possession of the requisite skill and learning by practitioners of medicine, surgery, and dentistry. The possession of such special qualifications as to knowledge and skill is so essential to the protection of the health, lives, and comfort of the people of the State, that it cannot be doubted that it is within the power of the Legislature to secure it by the enactment of such reasonable conditions as are calculated to exclude from practice those unfitted therefor.

"*Hewitt vs. Charier*, 16 Pick. 353.

"*State vs. State Medical Examining Board*, 32 Minn. 324.

"*Eastman vs. State*, 7 West. Rep. 421 (Ind).

"Is the statute repugnant to the Federal or the State Constitution in any of its provisions? It is contended that it is in violation of Section 2 of Article 4 of the Constitution of the United States, and of Section 1 of the Fourteenth Amendment to the Constitution, because it discriminates against persons engaged in the same business or profession, and denies to them the equal protection of the laws, and that it is in violation of Article 2 of Part First of the State Constitution, which declares that all men have the natural and inherent right of acquiring and possessing property and seeking and obtaining happiness.

"Section 3 of Chapter cxxxii., 'General Laws,' upon which the indictment is based, provides that 'it shall not be lawful for any person who is not duly authorized to practise medicine or surgery to do so unless such person has secured a degree from some college or university authorized to confer the same, or shall have obtained a license from the New Hampshire Dental Society.'

"Section 6 provides that 'each person receiving a license upon examination shall pay, for the use of the society granting the same, the sum of five dollars; upon diploma, one dollar.'

"Section 3 declares that 'the provisions of the preceding sections

shall not apply to persons who have resided and practised their profession in the town or city of their present residence during all the time since January 1, 1875, nor to physicians residing out of the State when called into the State for consultation with duly licensed physicians, or to attend upon patients in the regular course of business.'

"While the power of the Legislature to impose restrictions upon the exercise of certain trades and professions for the protection of the public is unquestioned, it must be exercised in conformity with the constitutional requirement that such restrictions must operate equally upon all persons pursuing the same business or profession under the same circumstances. The constitutionality of a statute cannot be sustained which selects particular individuals from a class or locality, and subjects them to peculiar rules, or imposes upon them special obligations or burdens from which others in the same locality are exempt.

"Cooley's Constitutional Limitations, 391.

"The imposition of special restrictions or burdens, or the granting of special privileges to persons engaged in the same business under the same circumstances is in contravention of the equal right which all can claim in the enforcement of the laws, and in the enjoyment of liberty, and the right of acquiring and possessing property.

"If the statute had declared that these provisions should not apply to persons practising their profession in the city of Concord, such an arbitrary discrimination would be clearly repugnant to the principles of constitutional equality.

"The exemption of all physicians, surgeons, and dentists residing and practising their profession in Concord from the burden of procuring and paying for a license, and the subjection of all other persons practising the same professions elsewhere in the State to the expense of purchasing a license, would be a palpable violation of constitutional rights.

"The exemption of the statute of persons who have resided and practised their profession in the town or city of their present residence during all the time since January 1, 1875, or during all the time from January 1, 1875, to January 1, 1879, from its operation, is no less in conflict with constitutional provisions.

"By an arbitrary test having no reference to skill, learning, or fitness for the practice of that profession, certain persons are exempted from the payment of a license fee, to which others of equal and perhaps superior acquirements and experience are subjected. It is a discrimination founded solely upon the accidental circum-

stance of residence, or of a change of residence, and falls within the prohibition of the constitution.

"The statute also discriminates against citizens of other States. It does not apply to persons residing and practising their profession in the same town or city in the State from January 1, 1875, to January 1, 1879, whence persons who have resided and practised their profession continually since January 1, 1875, in the same town or city, in another State, are required, upon removing, to procure another license to practise their profession.

"The objection to the statute is that it imposes the burden of a license fee upon certain persons and exempts others of the same class and profession, under similar circumstances and conditions.

"*Loon Hing, vs. Crowley*, 113 U. S. 703.

"*Yick Wo vs. Hopkins*, 118 U. S. 356.

"Demurrer sustained."

Dr. Fillebrown stated that he was authorized to express the thanks of the New Hampshire dentists for the kindly interest exhibited by the Association.

Dr. Taft offered a resolution, which was adopted, for the appointment of a permanent committee on necrology, to consist of three members, to act without further instruction from this Association as occasion may require, and report at the annual meeting of the society.

Committee on Credentials made a partial report.

ADDRESS OF PRESIDENT HARLAN.

It is a time-honored custom, I believe, to have the President of this Association deliver an address, no matter how short or how long. Mine will be short.

The American Dental Association convenes to-day for its Thirty-first Annual Meeting. For the first time in its history we miss the familiar face and form of our lamented first-elected president, Dr. W. H. Atkinson, of New York, who died April 2, 1891. Dr. Atkinson was one of the most conspicuous figures in this body from the earliest period of its existence until our last annual meeting. It is not saying too much for him to say that he did as much, nay, more, for the building up of this Association than any single member whose name can be mentioned. It is a matter of personal sorrow to every one assembled here to find that his place is vacant, and that we shall see his face no more.

During the year other eminent and useful members of this profession have departed, the most notable being Dr. Maynard, of

Washington, a man who practised before dental colleges were established in this country, and who not alone gave his thought to the profession of his choice, but to other professions. He was a celebrated inventor, principally of fire-arms. He was a most progressive member of the society, and we feel that it has lost one of its most illustrious examples.

I must also mention Dr. White, the editor of the *Dental Cosmos*. Dr. White was a faithful member of this society, and attended the meetings in the capacity of a journalist, and to him we are indebted for the splendid line of transactions for years past. He was one of the few thoroughly well-qualified dental editors of this country. We speak the sentiment of the members of the society when we say his place cannot be filled either as a journalist or as head of the great house of which he had acted as president since the death of its founder.

The President feels that there are some topics which may be briefly touched upon relative to the usefulness and progress of this Association, and one of them is the method of doing work by committees. At one time it was thought best to leave the work to committees entirely. A glance at the transactions during that period will show that nearly all the work has devolved upon the chairman. The sectional system in an association as small as this seems to me unsuited to the best scientific work. It makes it incumbent for the chairman to assume the whole responsibility, and has a tendency to stifle individual workers. If there should be any personal ill-feeling existing between the members against the author of a paper, which I regret to say is sometimes the case, it often happens that papers are suppressed and never reach this body.

The President would respectfully recommend that a committee be appointed to inquire into the matter and see if an improvement to this effect cannot be made.

Another thing that the President would speak of, as affecting the interests of sections, would be this: that there should be a more general rotation in the filling of the office of president and secretary. It would increase the number of workers. I know that the chairman and secretary of some sections have been in office for many years, and it seems that this continual keeping in office has a tendency to detract from the usefulness of the members of such committees. It has happened in my own case. Although I have desired a rotation and the infusion of new blood, the members have refused, and I have filled that office with great reluctance. If it could be done with rotation, it would be a great benefit.

Another thing that was last year touched upon slightly was the method of doing the miscellaneous business of this Association. A committee was appointed on this subject. From the knowledge of the workings of the Odontological Association of Great Britain, the American Dental Association, the Illinois State Dental Society, and other societies in the United States, the plan of having an executive counsel perform all the strictly business work of the Association would seem a desirable one. Such a method leaves the society free to devote all its time to the reading of papers and the discussion of the same.

If the society saw fit to leave all its transactions to the Executive Committee of the Association, it seems to me that much more and better work would be accomplished.

In order to be a thoroughly American Dental Association, it should be possible for us to meet at any point in the United States, but under our present constitution it is impossible that this meeting should be convened at any point south of Mason and Dixon's line at the time fixed for our annual sessions. We recognize that there is a field for the creation of Western and Southern and also Eastern dental societies, but the one in which we are most interested should have its meetings at a time of the year when it would be most convenient to attend the sessions. As it is now, we must meet the first Tuesday of August in every year.

If you will consider this for a moment you will see that our membership would be greatly increased if we could go into a place where we have never been.

If the Association delegates its business to the Executive Committee, and gives them the power to effect this change, it is expected that the membership will be largely increased during the next ten years.

The question of increasing the interest in the annual meetings has been in my mind for a long time. Since a change has taken place in the political history of this country by the addition of new States, we should make effort to see that State dental societies are organized in every Territory and State now in existence. It would also be a matter of interest that local societies should be formed in towns and cities where it would be practicable,—in cities and towns of from twenty-five thousand to fifty thousand inhabitants. This is a matter to which I would call your especial attention, and urge immediate action.

At our last annual meeting a resolution was adopted appointing a general executive committee for the purpose of organizing the

World's Columbian Dental Meeting. By the generous distribution of funds as would be needed, we will accomplish a double object:

First. To secure a larger membership for local societies and State societies, and increase the interest in the same.

Second. By so doing we will assure for the projectors of the meeting full and cordial support.

During the past winter a meeting was held at Washington. Various committees were appointed, and they worked to make this a splendid success. It devolves upon you, gentlemen, to give this committee cordial support to secure not only the best efforts of our best men in the production of papers, but to make instructive clinics before the people of the world, and astound them with the progress of American dentistry and dental surgery.

I am sure that the most cordial co-operation will be given to this meeting from members of the profession residing in foreign countries. Every one agrees that it will be a convention of the most learned dentists of the world, and it seems that this would be an occasion never to be forgotten.

The Association has cause for congratulation to-day in the fact that at the beginning of the fall sessions a third-year course in our colleges becomes obligatory. It was agitated for some time past. Everything bids fair to make this new departure a firm fixture, and after a three-year course in one of the reputable colleges an American dentist will compare favorably with any dentist on this side of the water or on the other.

The Association is to be felicitated on its general progress.

A committee of five was appointed to take the President's address into consideration, and take such action on the recommendations therein contained as may be proper.

The Chair appointed Drs. Abbott, Barrett, Truman, Fillebrown, and Noble as the committee.

Adjourned.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular monthly meeting of the American Academy of Dental Science was held in the Boston Medical Library Association rooms on June 3, 1891, President Seabury in the chair.

The paper of the evening was read by Thomas Fillebrown, M.D., D.M.D. of Boston; subject, "Vitality as a Germicide."

(For Dr. Fillebrown's paper, see page 678.)

DISCUSSION.

Dr. Potter.—The most ardent advocate of antiseptic surgery would not undervalue the very great assistance rendered by the vitality of the tissues. Leucocytes have, without doubt, great germ-destroying power, but can we not in some way assist the vital power of the tissues?

To my mind there are several ways of so doing. First, by the mechanical removal of germs through washing. Secondly, by the drainage of wounds. Thirdly, by the use of substances which lessen the power and vitality of the germs, causing them to more readily yield to the germicidal action of the leucocytes; in other words, by an intelligent use of so-called antiseptics or germicides.

Dr. Briggs.—To any one who has given this subject thought, it must at times have seemed as though we had gone into this antiseptic treatment so thoroughly and with such enthusiasm that there would be a reaction, and that a time would come when with more knowledge much of our present treatment would appear to have been unwise or unnecessary. It does not seem to me that we have reached that point yet. Dr. Fillebrown speaks of the agencies which were developed at the time Listerism came into vogue. I have not looked into the subject, and I may not be correct in my statement, but my impression is in regard to the matter of skill that there has not been such great improvement. The improvement has been in the courage to do, because results were found to be better when aseptic conditions were produced. Listerism, as I understand it, was not so much asepticism as it was carbolicism. For a long time the only thing used was carbolic acid, as though that was the main thing and not the underlying principle of cleanliness. Nature makes things clean by washing and diluting, and it is understood that germs must be present in some certain force to produce certain results. I think I have seen the statement about a small-pox hospital that the air-space of six hundred feet was sufficient to prevent infection. Now, there must be some germs beyond that six hundred feet, but they do not get there in sufficient force to do damage. In our efforts at antisepticism we dilute and disperse these germs, even if we do not kill them all, so that they are not present in sufficient numbers to work injury.

To go back to the point spoken of about the skill, I think that we do the former operators great injustice when we speak so much about modern skill. The matter of drainage is not so important in

the most advanced surgery of to-day. At the Massachusetts General Hospital they now take a patient with a compound fracture, and after having washed the parts and made everything clean, they put that leg up in a plastic splint, and let it alone till the fracture is united. Formerly, as you all know, a compound fracture was considered one of the most serious injuries, and drainage was thought absolutely necessary in treatment. So there is something (it may be the cleanliness) gained by the use of antiseptics. While I think we have overdone the antiseptic treatment, I do not think we should regard it as a past principle, and cast it aside. The use of antiseptics should go hand in hand with cleanliness. While antiseptics do not kill all germs, they do kill some, and inhibit others, and meanwhile the vitality of the patient carries on its work of repair.

Dr. Williams.—I have always understood that the use of antiseptics was simply as a road to, and, in many cases, a necessary way to arrive at, asepsis. We must have it in some way, and in some cases the leucocytes are not able to conquer the mischievous bacteria; then we must have some help, just as in many local and constitutional troubles we help nature to work in the way she wants to work. In our endeavors to get immunity from these morbid elements, whether we arrive at it by constitutional vigor or whether we help this vigor by neutralizing the enemy, we attain the same point. But we all know that constitutional strength is not always sufficient to overcome the enemy.

Dr. Briggs.—One word more. It is pretty hard to separate this absolute cleanliness from the use of antiseptics. I have not felt at any time that the use of strong germicides, so strong as possibly to be irritating to the parts, was necessary. Those are extreme ideas, but we do not have to go to the extremists to get the best methods, and it seems to me that if we wish to carry out the idea of making everything clean, cleanliness can be best obtained by the use of these antiseptics. We have got to use them on the instruments to destroy all possibilities of germ life, whether we give up the idea or not that a germicide must be used on the parts affected. If it goes forth that we can get along without antiseptics we are not going to get cleanliness, because our present means of sterilizing instruments is not sufficient unless we use those things.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

Editorial.

CRITICISM OF DENTAL COLLEGES.

LEGITIMATE criticism is always valuable, whether applied to persons or institutions, and if this is made in the right spirit it becomes a powerful stimulus to progress. The use and not the abuse of this power has had much to do with forcing the dental profession to make advanced steps; indeed it is questionable whether in educational matters dentistry would to-day be not where it was twenty years ago had it not been subjected to this both at home and abroad.

The natural tendency of the human mind is towards conservatism,—a willingness to let things rest quietly in present grooves, and deprecating any disturbing element. The active colleges of this country were exactly in this condition less than a decade ago, and but for this outside force would probably be in the same pitiable state to-day. Their inability to throw off the accumulation of years of erroneous practice was so clearly apparent that the organization known as the Association of Dental Faculties became an absolute necessity. Through the combined operation of internal and external forces, dental education has been brought to a position worthy the respect of all classes and of all professions.

Criticism, being disarmed on the old lines, has begun an open attack on the internal management of these schools, and a sample of this was given our readers in the September number of the JOURNAL, entitled "The Use and Abuse of Dental Charity," by Richard Grady, M.D., D.D.S.

We would not deem it our duty to make any observations upon this paper had it given intrinsic evidence that the subject-matter discussed had been obtained by personal observation and experience, and not secondarily, from loose statements of individuals or letters from deans of colleges.

The criticism of the writer in general has force, for there can be no question but that abuses have arisen in many colleges, perhaps to a limited extent in all, and need careful attention.

The paper claims to be a carefully-prepared document, based on answers received from various persons in authority. Accepting this somewhat uncertain method of acquiring information, the

writer proceeds to build up a theory which seems to us as weak as the foundation upon which it is laid.

It was early found by the fathers that the only possible way of teaching dentistry was to abandon the old methods familiar in medical schools, and mainly confined to didactic lectures, and, while not excluding these, adding thereto practical work on the living subject. The years of experience that have elapsed since then have confirmed the wisdom of this view, and the student of to-day, with natural ability, on graduating will compare favorably with older practitioners in oral manipulations. This cannot be said of any other profession, and is unquestionably due to the methods adopted.

We do not understand the essayist to dispute this well-understood fact, but he persists in regarding the present plan as an "abuse of dental charity," and that its tendency is to pauperize the people.

The charge that colleges are making money is dwelt upon at some length, as though this was something no college had a right to do. To make money means with him "an abuse of dental charity." Yet it has never been shown, or acknowledged by the colleges, that they were charitable organizations in any sense of the word. The object of their existence is to educate young men in dentistry, and if, in so doing, the income exceeds expenses, it is not a matter that need concern either the profession or the general public.

The point to be considered is not whether money is or is not made, but whether this mode of training be the correct one. The college faculties recognize the fact that no other available mode exists, and to abandon it now would mean the destruction of dental education. The old method of preceptor-training was, and is, an admitted failure, for the reason that the student rarely could get beyond the mechanical laboratory, oral operations being prohibited. With present methods theory goes hand-in-hand with practice, and so thoroughly interwoven into the mental nature of the student as to be an ever-continuing active force.

While colleges are not working on altruistic lines, yet the importance of the labor performed by them for the good of the people is incalculable, and outweighs any injury the practice adopted may have been to individuals. So thorough has been this training in our large cities, that the masses now fully recognize the value of dental work, and are willing to pay for it as they never have been before, and in proportion to this knowledge has the health and comfort of large bodies of people been increased.

The essayist seems to recognize only one side of the question,

and that the selfish one, its effect being to "lower the dignity or emoluments of private practice," "warring upon the livelihood of their professional brethren," and, consequently, it is an injury to the profession in all cities afflicted with colleges. It lowers the standard of remuneration. It invites persons who can pay to have their work done at rates below a living basis. It lowers the profession in public estimation and debases all concerned. This in substance constitutes the arraignment.

The remedy for this, as stated, demonstrates very clearly that his experience has not been an extended one in the management of dental colleges. His panacea for the ills enumerated is to place a sign at the entrance door, "For the poor only." A very limited knowledge of human nature would settle that question. The idea of "poor" in the mind of the essayist seems to be those under the care of "charity organizations," or perhaps the residents of those wretched quarters common to all cities,—the last resting-places of vagrant humanity in life. Neither of these classes are proper subjects for the dental infirmary. The families of the laboring poor is the class next above; but these cannot spare the time, however much they may desire it, to visit, day after day, the operating-room for careful attention.

The class of really poor but very respectable working-girls in factories and stores is the one which fills our college infirmaries. It is a mistake to suppose these latter are patronized by the wealthy. It is true that occasionally a person actuated by miserly motives, or under the idea that they will secure better operations, will visit these institutions; but an experience of many years, from demonstrator to principal, in college work, leads the writer of this to the conclusion that these cases are exceptional, and that in reality the labor is done for the poor, and that at reasonable rates, and in this sense may be strictly within the lines of charity.

Experience has demonstrated that no rule will answer that attempts to discriminate between the amount of wealth of individuals. To ask a person, "Are you able to pay?" means an insult to be resented. To judge by the clothing opens the door to failure. To charge fees equal to those received in private practice means destruction to this mode of training. In a word, no plan has been suggested that will help to solve this problem, and any attempt to force matters by protective associations must prove a failure.

Education must advance in the progress of evolution of methods. Change means injury in certain directions. The forces that underlie all advances are destructive in their character for a time, and then

comes the period of equilibrium and the interval of compensations. The advent of machinery caused ruin and sorrow to thousands, but in the advancing years brought comfort and measurable competence to an indefinite number. The injury that the essayist complains of may be a real one to the few, but that it is a blessing to thousands outside of cities must be clear to the intelligent observer. Colleges have filled every town and hamlet with an educated and trained class of men, and at the same time driven out the ignorant, untrained, travelling tooth-extractor.

In conclusion, we must regard Dr. Grady's paper as valuable, in that it will stir thought in this direction; but that its tenor is simply iconoclastic must be conceded. It gives no evidence of ability to build better than the experience of a half-century has demonstrated as the only possible way to educate the dental fraternity of the present epoch.

NITRATE OF SILVER.—STEBBINS.

WE generally permit papers published in the JOURNAL to go to the readers without notice, but the one prepared by Dr. Stebbins, in this number, giving his experience with the treatment of caries in deciduous teeth, is so remarkable as to demand special attention. If his results are sustained by others it must be regarded as a positive advance in the treatment of these teeth, and opens up possibilities in other directions difficult now to realize.

We had the pleasure of examining cases at Saratoga treated with this agent at different periods, the longest six years, and, while exposed all that time to the action of the secretions of the mouth, they gave no evidence of destructive action.

Dr. Stebbins has taken the truly scientific course in waiting and experimenting for six years before giving this to the profession.

TO THE "DENTAL REVIEW."

ARE we correct in presuming that the failure to give the JOURNAL credit for its "List of Houses at Saratoga Springs, N. Y.," copied in the July number of the *Dental Review*, was one of those unintentional errors that will occasionally annoy the most conscientious editor?

DEPOSIT PLATES.

It will be noticed by reference to our advertising pages that Dr. C. S. Stockton has assumed the charge of making these plates. From Dr. Stockton's well-known ability, we have no doubt that many of the difficulties incident to this work will be overcome, and they be made entirely satisfactory.

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This standard work comes to us now in its eighth edition. It has long since passed beyond criticism, and is universally regarded as an authority on all subjects upon which it treats. The original work of the author has contributed much to advance therapeutics to something akin to scientific order, and to raise it from the condition he so forcibly describes in the preface to the first edition: "What to-day is believed is to-morrow to be cast aside. . . . What has clinical therapeutics established permanently and indisputably? Scarcely anything beyond the primary facts that quinia will arrest an intermittent, that salts will purge, and that opium will quiet pain and lull to sleep.

"To established therapeutic facts the profession clings as with the heart and hand of one man,—clings with a desperation and unanimity whose intensity is the measure of the unsatisfied desire for something fixed. Yet with what a Babel of discordant voices does it celebrate its two thousand years of experience!"

Whether the time will come when the empiric use of drugs will give way to at least an intelligent conception of what is required remains a still unsolved problem; but the tendency to use other means is developing, and this is recognized by the author, who writes in his introduction, "In the treatment of chronic disease the best results are to be achieved by the regulation of the habits and mode of life of the patient, and by the employment of certain remedial measures other than drugs. Of late years the importance of modes of relief other than medication has so grown in my esti-

mation that I have concluded in this edition to consider them at some length."

This edition has not been subjected to the "revolutionary changes" of the seventh, but there has been added the following subjects, re-written and "practically new:—" "The whole subject of anæsthetics, the articles upon cocaine, strophanthus, caffeine, antipyrin, antifebrin, phenacetin, hydrastine, paraldehyde, lead-poisoning, etc. Among the absolutely new articles may be mentioned sulphonal, chloralamid, aristol, and others."

Objection may be made to the narrow limits to which the author confines the word *therapeusis*, and the relegation of disinfectants and antiseptics to hygiene. "It is evident," he writes, "that the consideration of these materials belongs to the province of hygiene rather than to that of therapeutics, since their employment is hygienic rather than medicinal, preventive rather than curative."

While this view may have been true in the past, it is not wholly so at the present, and the *therapeusis* of the future must concern itself with the removal of causes of disease if it is ever to accomplish anything upon a scientific basis. It may be difficult to destroy the pathogenic forms that originate many of the diseases, but it does seem unwise to assume that treatment here is "preventive rather than curative." The clinical observations in local treatment have demonstrated beyond cavil that the destruction of pathogenic bacteria in diseased tissues means a rapid restoration to normal condition, and if true here it may be made true in the broader sense in general treatment.

With this pronounced view of the author, this chapter will not be found to be entirely satisfactory. That portion devoted to peroxide of hydrogen is meagre in details. In view of the extended application of this agent, and its recognized value in the treatment of some forms of disease, a fuller description would have been valuable.

The use of tincture of chloride of iron is described as being "very destructive to the teeth; care ought to be exercised in its use about the mouth, and also in its administration." As dentists, we have reason to complain of this slight allusion to one of the most destructive agents used in the treatment of disease. There is no one that has given dentists more trouble, or that has been used by the medical profession with more indifference. It is certainly time that works of this character should teach that so injurious is the tincture of chloride of iron to the teeth, that some other form

of iron should be substituted; or, if this be not possible, minute description of modes to combat its injurious effects should be given, as the use of antacids. We would refer the author to the pages of the August and September numbers of the JOURNAL for some forcible facts in this connection.

While there may still be "Babel" in therapeutics, there is so much of order in this work that it lifts the treatment of disease nearer to scientific methods, and gives promise of the possibilities of the future.

It scarcely need be said of anything to which Professor Wood places his name that it should be in the hands of all practitioners, whether in general or special practice. They cannot be without this work and be intelligent upon the subjects on which it treats.

Domestic Correspondence.

A COMMUNICATION FROM THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

TO THE EDITOR:

The enclosed is a brief review and summary of the recent litigation of the International Tooth Crown Company *vs.* Edward S. Gaylord *et al.*, recently ended by a unanimous decision from all the judges of the Supreme Court of the United States, in which the Richmond Crown Patent and the Richmond Patent on Preparation of Roots for Crown were declared invalid. This is the case that the Dental Protective Association of the United States took up and defended in the Supreme Court, in association with, and at the request of, Dr. Northrop's committee. I will state that by the result of this decision all forms of Richmond crowns are now open to the dental profession for manufacture and free use, as well as the Richmond method or process of preparing roots for his crowns, which was a patent for freezing and cutting off the tooth and driving the pulp out and immediately filling the end of the root at one operation. The decision of the Court occupies a number of printed pages, but in substance is as follows:

First.—That what Richmond had done before the taking out of

his crown patents disclosed substantially whatever invention there was in his crown, or process of making, and this invention had been in successful use over two years before being patented, consequently had been dedicated to the public. Some later changes in construction were made the claim for sustaining the patent; the claim being that only after these changes were made was the invention a success, and that it was in use only as an experiment before, to which the Court said,—

That whatever changes were made as appearing in these patents, from what existed before and was known to modern dentists, was not invention in the eye of the patent law, but simply the mechanical skill of a skilful dentist.

While this decision is of incalculable value to the dental profession, it must not be forgotten that the decision does not end, by any manner or means, the litigation between the International Tooth Crown Company and the dental profession. That company owns some twenty-five or thirty other patents relating to dentistry, some of these being in suit. One of these patents, known to the profession as the "Low Bridge," was sustained by Judge Wallace in the United States Court for the Southern District of New York, some four or five years ago, and before the Dental Protective Association of the United States was organized. And the Dental Protective Association is now engaged in an extended and expensive contest in the Federal courts to secure its defeat and to have the same judicial declaration of invalidity declared against it by the United States Courts as has just been obtained upon the cases referred to.

We stated in our former circular that any one not a member of the Association before May 15, if sued after that date on the Richmond Crown Patents, would not receive the defence of the Association, but as we have wiped out the Richmond Crown patents, this limit to membership is removed and any one not a member can still have an opportunity of joining. We feel justified in saying that it is asking but a little of each one to send in the ten dollars membership fee, and do their part in this great work, which is so well begun, of freeing us from bondage. The next great battle, which we now have with the enemy, is defeating them in suits brought upon the "Low Bridge" patent, which will be made the basis of another circular and communication, with full information, within a short time.

J. N. CROUSE,
Chairman.

Current News.

THE OHIO STATE DENTAL SOCIETY.

THE Ohio State Dental Society holds its next annual meeting in the city of Columbus, on Tuesday, Wednesday, and Thursday, December 1, 2, and 3, 1891.

No pains will be spared to make this, in every way, an attractive meeting, and we extend a cordial invitation to members of the profession throughout the country to be present. Ample accommodations and liberal inducements will be given for the exhibition and demonstration of new and useful appliances, instruments, etc.

The geographical situation of Columbus and its extensive railroad connections make it easily accessible from all directions. Arrangements have been made with the Central Traffic Association for reduced railroad rates on the certificate plan.

E. G. BETTY, *President*, Cincinnati.

OTTO ARNOLD, *Secretary*, Columbus.

THE FIFTH, SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF NEW YORK STATE.

THE Fifth, Sixth, Seventh, and Eighth District Dental Societies of New York State will hold their Sixth Annual Joint Convention at the Iroquois Hotel, Buffalo, October 27, 28, 29. Of all the dental meetings held in this country, none are more profitable or more largely attended than these conventions, and the one this year promises to surpass all others in points of interest and attractiveness. Prominent men from this and adjoining States, and Canada, have already signified their intention to be present. An unusually interesting programme of essays and clinics is being prepared; there will also be a special collection of abnormal and pathological specimens relating to dentistry, and a cordial invitation is extended to all dentists to attend the meeting, and to contribute to the collection.

Special rates upon railroads will be secured, and all arrangements for the comfort and convenience of those attending will be made.

For any information regarding the meeting, address the chairman of the committee,

CHARLES S. BUTLER, Buffalo, N. Y.

POST-GRADUATE ASSOCIATION OF THE UNITED STATES.

THE annual meeting of the Post-Graduate Dental Association of the United States was held at the Leland Hotel, Chicago, June 24, Dr. Cushing, president, in the chair.

The order of the day was reports of officers, transaction of routine business, election of officers, and interesting discussions in regard to the future work of the society.

Officers elected for the ensuing year are as follows: President, Dr. R. B. Tuller, Chicago. Vice-Presidents, Dr. Levi S. Keagle, Vinton, Ia.; Dr. A. P. Nicholson, Edgerton, Wis., and Dr. M. R. Julian, Lafayette, Ind. Secretary and Treasurer, Dr. L. S. Tenney, Chicago.

This organization has just completed the second year of its existence and seems to have struck a popular chord in the profession, as its rapidly increasing membership would indicate.

As is generally well known, the object of the society is mainly to establish a systematic course of home study, and measures are now on foot to begin this work during the year.

Those desiring further information should address the Secretary, Dr. L. S. Tenney, 96 State Street, Chicago, Ill.

NEW HAMPSHIRE DENTAL SOCIETY.

At the last annual meeting of the New Hampshire Dental Society, June 16, 1891, the following officers were elected: President, W. R. Blackston, Manchester; Vice-President, C. P. Webster, Franklin Falls; Treasurer, G. A. Young, Concord; Librarian, G. A. Bowers, Nashua.

Executive Council.—J. H. French, Penacook; E. C. Blaisdell, Portsmouth; E. B. Davis, Concord.

The Society will hold a special meeting at the Manchester House, Manchester, N. H., on September 29, 30, and October 1, 1891. All members of the profession are cordially invited to attend. Efforts are being made to make this the largest and most profitable meeting of dentists ever held in the State. Come and make it a success.

B. C. RUSSELL,

Secretary.

KEENE, N. H.

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Original Communications.¹

A FEW WORDS IN REGARD TO THE STERILIZATION OF INSTRUMENTS.²

BY HAROLD C. ERNST, M.D.³

MR. PRESIDENT AND GENTLEMEN,—I have had a great many serious qualms when I have thought about what I should say here to-night, and it has distinctly entered my mind that certainly most of what I shall have to say is not new to any of you, and most probably it is none of it necessary.

The question of the sterilization of instruments is an important one from the modern views of the etiology of disease,—quite as much for the dental surgeon as for the surgeon operating on other parts of the body. The etiology of the different forms of disease resulting from what we call wound-infections has been so cleared up, and we know so much more about them now than we did ten years ago, that the principles upon which sterilization should be based are principles of actual fact and knowledge, and not of theory, and it therefore seemed to me that it might be of interest

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Before Harvard Odontological Society, 1891.

³ Instructor in Bacteriology, Harvard University.

to you if I explained briefly, and as plainly as I could, what those principles are.

In considering the sterilization of instruments, the first question which comes up for our investigation is to know exactly what sterilization is; and that can be much more distinctly brought to your minds by the consideration and differentiation of a number of terms that are very apt to be confounded and used interchangeably. We often hear of *germicides*, *antiseptics*, and of compounds, which by virtue of their elements, it is claimed, can be employed for sterilization, that are neither of these, but are simply *deodorants*. These are the three things that are used, and said to be effective, in accomplishing the sterilization of instruments or dressings of infectious wounds. The meaning of the word "sterilization" is the destruction of all forms of microscopic life which may exist upon the instruments or dressings which we wish to use. Now, a deodorant is a very different thing, as you can easily see when the name is brought up by itself; it indicates that it takes away odors, but it does not destroy vitality. The word "antiseptic" is also quite generally supposed to mean germicide; but the action of an antiseptic is merely to prevent the actual carrying on of the processes of germ life by rendering their habitation unfavorable, and yet is not destructive to the vital forces themselves. A *germicide*, on the other hand, is the one thing that we are striving for to obtain perfect sterilization, and it means, of course, something that is actually destructive to germ life of all kinds,—not simply bacteria, but the other forms of organic life that are known to be productive of pathological change. The distinction between these words is not carefully observed, even by those who we would suppose should thoroughly understand it, and we often see in the advertising columns of reputable medical journals something lauded to the skies as a germicide or sterilizing material that is purely and simply a deodorant, and has absolutely no effect in the destruction of the vital forces that one desires to get rid of. It is because of this confusion—and it is through the influence of the commercial manufacturer that the confusion is fostered—that I have laid so much stress upon the differentiation of these terms. This evening, then, we shall have nothing to do with the deodorant, nor with the antiseptic; but we do want to know what is the best germicide for the sterilization of our instruments, and what is the best method of applying that germicide.

Understanding now that by sterilization is meant the actual destruction of any or all forms of vitality that may be in existence

upon the instruments or dressings one desires to use, we will find that this sterilization may be completed in a number of different ways. In the first place, it may be accomplished by the use of chemicals, which is a very common and very easy method for certain purposes. In the next place, it may be done by heat; and, as you are aware, the heat that may be employed for sterilizing is of two kinds, the dry and the moist.

In considering the question of the employment of chemicals, we find that we are obliged to use something that is not destructive to the delicate instruments that you use in your every-day work, and, as a rule, chemicals, of which corrosive sublimate is the most efficient, when they are used in sufficient strength to accomplish the destruction of bacteria, not only destroy those bacteria, but also destroy the instrument; so that in accomplishing complete sterilization, chemicals, so far as any that I know of, are out of the question for your purposes.

We come then to the consideration of the employment of heat. Dry heat is extremely effective if it can be used; but the vital objection against its employment for the sterilization of instruments in your profession is, that when used at the actual temperature that is required to effect complete sterilization, it will inevitably take out the temper of any instrument that is subjected to it, which, of course, excludes dry heat as a means for sterilizing as far as your necessities are concerned.

Now, we have excluded chemicals, and also dry heat, and the next question is the employment of moist heat. Of course, you understand that there are certain things that we may require to sterilize that will stand moist heat, and certain other things that will stand dry heat better than moist; but if the moist heat can be used, it is the quickest and most effective means for accomplishing sterilization of which we have any knowledge. Moist heat may be applied in two ways: by boiling, that is, by placing the instrument in a water-bath heated to the boiling-point, or by the use of what is called the steam sterilizer, by the use of which the moist steam, passing over the instruments, accomplishes the sterilization; this latter method is quicker and more effectual than the ordinary boiling, and is also applicable to a wide range of instruments. The common apparatus for applying moist heat, when of steam and not of boiling water, consists simply in a receptacle which holds the water, with a grating over it, upon which the instruments are placed, and a vessel running up and around the instruments, forming a retaining-wall for the steam, having a loosely-fitting cover to put

the steam under slight pressure. The very best apparatus for the application of steam heat that I know of is the Arnold Steam Sterilizer. I know it is not usual to mention the name of any particular manufacturer at a meeting of this kind, but this apparatus has decided advantages over any others, and it cannot be spoken of without using the name; its perfections have been recognized not only here but in Europe, where it is now being copied, the manufacturers having stolen the model without giving credit to the inventor. It consists, roughly speaking, of a reservoir that comes immediately over the flame, into which is put only a thin layer of water. When the water has been turned into steam, it passes up into the chamber and over the instruments, then through the holes in the loosely-fitting cover, where it is retained by the outer hood or jacket, and, becoming condensed, drips down the sides again into the reservoir next to the flame, where it is again converted into steam. It does not allow any steam to escape into the room, and so could be placed wherever most convenient. I have had one of them in my laboratory heated to nearly 110° C. without anybody realizing that there was any steam on at all, and by its use the destruction of the most virulent organisms that you could place upon your instruments can be thoroughly completed in about twenty minutes after the steam has begun to pass. The objections that have been raised against steam sterilizing are, that it rusts the instrument, and that there is a possibility of injuring the temper of some of the more delicate. As far as the injury to temper is concerned, I have not seen it occur in my experience, and I believe there is no ground for such objection. With regard to the injury to the polish or rusting of the instruments, unless they are taken out and allowed to cool before drying, there will be little trouble of this kind. It is the quick cooling, and not the application of the steam, that injures the polish of the instrument, and if they are dried quickly after being removed, little danger need be feared from that source. I have thought over the thing a good deal, and considered carefully what I should recommend to you to-night, and I concluded that it would be impossible for me to tell you of any better method for sterilizing your instruments than to use one of the small sized Arnold Steam Sterilizers set over a Bunsen burner, in which your instruments can be placed, either in glass jars or in wire baskets. The glass jars seem to me to be more desirable, and for this purpose the ordinary marmalade jars that we get from the grocer could be utilized, placing a little cotton wool in the necks after you had put in your instruments. After heating, the instruments could be easily

removed and thoroughly wiped, and the sterilization be completed quicker and with less possibility of injury to the instruments than by any other method I know of.

Now, so much for the methods of sterilization, and it is all very well to say that such and such things should be done; but I venture to say there would be very little heed paid to it unless it was demonstrated why it should be done.

Of the greatest possible interest in the last few years to those who have followed the course of scientific investigation are the discoveries that have been made, and the absolute proof that has been brought forward that a large number of pathological conditions are due to the presence and rapid growth of the various micro-organisms, most of which are included under the term "bacteria." One of the processes that for a long time was unknown, and was supposed to give ground for the theory of spontaneous generation, was the process of spore formation,—that is, the process of certain bacteria changing from the full-grown rod form to the very thick-membraned, long-resisting spore. The spore is a thing that is specially difficult to get rid of. Bacteria require a certain amount of moisture for a favorable growth; if they are deprived of that moisture, they may produce this resisting stage called spores. In this stage they will resist drying for an indefinite length of time; will resist a considerable amount of heat, and are not easily affected by chemical action. Experiments have been made by Dr. Stone in my laboratory with the bacillus of tuberculosis, and the result shows that the bacilli that are present in every case of pulmonary disease when allowed to dry in the expectoration, on being moistened will resume their activity. In one case the sputum was allowed to dry for three and one-half years, and became so hard that it would take a hammer to break it up; but on being placed in water the organisms were easily detected by the microscope, and their vitality was shown by inoculation experiments. Therefore, drying is not a safeguard against certain diseases, particularly against spore-bearing bacteria. These spores form a middle stage of the life of bacteria, and in that shape the special variety of bacteria to which they belong cannot be differentiated. It cannot be positively stated what special disease they will produce, but their general characteristics are well known, and this fact of tenacious vitality is the most prominent,—the resisting all forms of drying, most chemical reagents, and any moderate action of dry or moist heat.

Now, these facts being settled, to come a little more distinctly to the point that bears upon your branch of the profession, let us

see how many of the diseases that are due to infectious agencies—to the bacteria and micro-organisms—may be transferred through the mucous membrane or the saliva, and how much we have to fear from them.

The most widespread disease that we have to contend with, and that is more destructive to human life than any other, is tuberculosis. It is now very generally conceded that tuberculosis is due to a micro-organism. This micro-organism is unquestionably possessed of the most resisting powers,—possibly the anthrax bacillus surpasses it somewhat, but not much,—and tuberculosis has its origin quite as frequently through the mouth as it does in other parts, and very frequently the cause of the disease is found in the saliva of the mouth, especially in pulmonary tuberculosis. Of course, it is impossible to detect the bacilli without the aid of the microscope; nevertheless the infectious agent is probably present in a large number of your patients, pulmonary tuberculosis being so prevalent. I know that it is present in all cases with which I am familiar, and it is fair to presume that a great many of my patients are also your patients. Therefore, tuberculosis is the first thing for you to be on your guard against, and it is against the possibility of infection that your patients are to be protected.

In the second place, not so frequent, comes the disease that is unfortunately too prevalent among our patients, and that is syphilis. It is one of the most dreadful diseases with which humanity can be affected, and its symptoms, as they occur upon the mucous membrane of the mouth and the inside of the cheeks, are altogether too common and well known by you to require from me any description. It is not so generally acknowledged that this is a germ disease, nevertheless enough of its characteristics have been learned by experiment and observation for us to be perfectly sure that it requires the same precautions against the possibility of infection as does tuberculosis. Here, then, are two diseases that may be transferred upon instruments used about the mouth.

A third, and one that by my belief is not as commonly recognized as it should be, even by members of the medical profession, is a disease that is known in the West as "break-jaw." It is due to a fungus, not a bacterium. It has been given the name of "actinomycosis," and the symptom that makes it known in cattle is the fact that it starts as an enlargement and suppuration of the sub-maxillary glands, and in all cases that have occurred in man it has also made its appearance in the glands under the inferior maxilla. So far as it has been possible to learn of this disease, it has always

gained access through the mucous membrane rather than through the skin, and it is my belief that there are many cases of that disease occurring in man that are generally classified as scrofulous disease, especially among children. Then, certainly, this is a disease against which these principles of sterilization should be directed.

Another disease, an experimental disease, because it has been studied principally by experiment, is due to the micrococcus Pasteuri (M. of Sputum Septicæmia). It produces a tremendous suppuration upon subcutaneous injection, and it is probably the cause of the bad results from bites and that class of wounds, and that give the surgeon so much trouble. The organism is destroyed with a great deal of difficulty by drying, and occurs in the mouths of apparently healthy persons.

Another disease, which does not occur commonly among your patients, from the fact that when a person is afflicted with it he is generally in bed, and yet that in its early stages might very readily be transferred, is diphtheria. It is now known that the sputum of a person ill with diphtheria is full of micro-organisms called the diphtheria-bacillus. This is also one of the rod-shaped bacteria that must be looked out for.

In order not to make this catalogue endless,—one of your profession, Dr. Miller, of Berlin, has completed it,—I will simply say that the remaining active micro-organisms that may be found in the mouth are the ordinary bacteria of suppuration, and two or three others; and as these are not infrequently found in persons who are apparently healthy, it is of course impossible to say on mere inspection that these bacteria are not present in full activity. Of course, the inference is that they must be destroyed before the instruments are used a second time.

Now, of the bacteria that I have named, with the exception of tuberculosis, syphilis, and actinomycosis, ordinarily careful washing and drying might do. It would be pretty certain to be sufficient for the less resistant kinds of bacteria; but for these three it seems to me that the possible resistance of any one of them furnishes a perfectly justifiable basis for a word of warning in regard to the sterilization of instruments. In all that I have said about the necessity for this caution, I hope you will not feel that I am trying to make an unnecessary scare. I have brought a few lantern slides to give you some idea of what these organisms look like.

(Lantern slides shown.)

HISTOLOGICAL METHODS AND RESULTS.

BY L. C. INGERSOLL, KEOKUK, IOWA.

WHEN we come to the discussion of a subject about which there are conflicting opinions, it is necessary that there should be a substantial agreement as to the sources of information and the kind of testimony to be admitted in deciding the question.

If there be not this agreement, and a definite understanding arrived at as to the character of the testimony, a satisfactory decision can never be reached.

It seems to be a foregone conclusion with many scientists that, in the investigation of histological questions, the revelations of the microscope are to be accepted not only as legitimate, but as superior to all other testimony; still further, that what the microscope does not reveal is not to be accepted.

If this position be taken, it becomes evident at once that the *ultima thule* of histology is circumscribed by anatomy, and the investigations of the microscope must be confined to lifeless, dead matter, and physiology must step aside and offer no testimony in a histological case. Is it true that physiology and anatomy are so distinct from each other that function has nothing to do in determining structure, and that structure has nothing to do in determining function? It requires both structure and function to form a living organism, and the organism must be studied in full view of both, and in full recognition of their harmonious teachings.

The teachings of the microscope must be made to harmonize with those of function, and those of function must be made to harmonize with the teachings of the microscope, while to each is accorded its separate work in furnishing testimony leading to a common conclusion.

But microscopists are inclined to magnify the knowledge gained through the microscope as so superior to all other means of information as to deny the right of any one to bring testimony from any other source, should it chance to be conflicting or any departure from the testimony of the microscope.

It is no wonder that microscopists should have a sort of worshipful feeling towards the microscope with its wonderful lenses, as the great revealer of hidden mysteries. Still, it will not answer for a man to deny the conceptions of the mind gained without it, or the deductions of reason based upon established facts. There is such a thing as a mental microscope, and such a thing as the

telescope of the mind. If one does not first use his mental microscope, his instrument of brass and glass will be of very little value to him. The latter instrument is but auxiliary to and corroboratory of the evidence of the former in most cases where life and function are concerned.

The microscope may reveal many things unerringly within its own peculiar realm, where it deals with inorganic matter, form, and structure. But function is out of its province; what function reveals may or may not be within its realm. And what the mental microscope and the deductions of reason reveal may be entirely out of the reach of the instrument of brass and glass for a time, then burst into view in the field with a *form* and *structure* that the mental, deriving its conception from function, had never before seen.

For example, Dr. Heitzmann claims to have discovered through this instrument a reticulum in protoplasm, a structure in "living matter,"—a definite arrangement of granules and interconnecting threads in the amoeba. Frommann claims to have seen the same; and perhaps Stricker and others. Would these distinguished gentlemen of science and skill allow any one, not a microscopist, to say that he saw this structure before they did?—not *as they* did, outlined and defined, but as a necessary part of the expression of vitality.

When it was said that the earliest embryonic form of organic tissue was but a minute mass of jelly endowed with life and capable of the manifestation of life, I accepted it as determining the origin of vital tissue. But when it was further said by microscopists that this jelly-like mass of living matter is structureless, I could not accept it. Not that I had looked through the microscope with better eyes than others, but the statement did not satisfy the mind. The statement did not contain a fully rational idea.

With this conception of a formless mass of matter before me capable of the manifestation of life, my reason used the astounding fact in drawing a conclusion, thus: If this amoeba, this bit of protoplasm, is capable, by an inherent power within itself, of manifesting life, it must have some method, some manner, some means, some way by which it manifests the fact that it has life.

The human mind can have no conception of a movement without some means by which the movement is produced. If the amoeba changes its form, it must do it by some method of connecting together its remote parts in harmonious movement, each part with every other part. This implies, necessarily, the existence of a structure,—does not define the structure, but declares its existence.

Thus the grand fact of structure in embryonic elements is brought out by the microscope of the mind, leaving to the instrument of brass and glass the more satisfactory discovery of its form and the general outlining of its parts.

Again, we reason from function that there is a circulatory system in dentine. We do not ask the microscope to define and map it out to the eye before we believe it. We know it in advance of observation. We know by that instrument the primary fact that there is a condensation of peripheral dentine; that the tubules of the dentine are filled up late in life with lime-salts at their outermost extremities, and from this primal fact we make the logical deduction that there must be a circulatory system through which the lime-salts are carried; and we know this whether the microscope reveals it or not. Some day it may be able to outline it.

Now, using the same methods of investigation, let us turn our attention to the ultimate distribution of the fibres of the pulp.

The reason I have for making the foregoing remarks may not be apparent to all readers of this article.

Two years ago I had the honor of reading a paper before the Odontological Society of New York City, on "The Relations of the Dental Pulp to the other Tooth Tissues," being the second paper which the Society had invited me to read before them on that subject. I based my arguments upon the generally accepted teachings of histology relating to other similar tissues, on the physiological function of the tissue in question, and on clinical experience.

In the discussion of the subject, almost no notice was taken of my argument from physiological function supported by clinical experience: function was combated with the microscope, facts ignored, and logical conclusions met by dogmatical denial and assertion without demonstration or proof. Dr. Heitzmann kindly excused my ignorance on the ground of my confession that I was not a microscopist,—intimating that other sources of information and other methods of investigation are not to be admitted in the study of histological subjects, thus setting aside clinical experience and function because they do not come within the field of the microscope, and saying of himself, "I am not a dentist, and simply judge from what I have seen under the microscope."

Dr. Sudduth betook himself to the *argumentum ad hominem*, and said of me and my paper, "When it comes to his interpretation of the histology of the pulp and its ganglionic character, and his conclusions in that direction, he is treading on ground that belongs to Dr. Heitzmann and myself. He is going into the special field of

the microscopists, and we must stop him, as he does not claim to be one of them." Again, after complimenting my physiological study of the pulp, Dr. Sudduth says, "Dr. Ingersoll does not claim to be a microscopist; and if he had not stepped over into the special field of histology, I should not have had anything to say regarding his views on the subject."

In January, 1890, nine months afterwards, the same subject was under discussion by the Society, introduced by a paper by Dr. George McCausey, in which Dr. McCausey, in speaking of the sources of knowledge, says, "The human animal acquires knowledge through the medium of the five organs of sense." Had he consulted mental philosophy, he would have found added, consciousness, reflection, and reason. The omission is, I think, characteristic of microscopists.

Then, again, he said, "In a consideration of the relations of the tooth-pulp to the other tooth tissues, the writer assumes that the microscope is the only medium through which we can arrive at facts;"—discarding, therefore, function and rational deductions, he turns to that alone, and impliedly rejects all declared facts unless they can be demonstrated by the microscope, and pronounces the Scotch verdict, "not proven," on everything not shown by that instrument. One word about the Scotch verdict that my microscopical friends have taken undue advantage of. It would have served their purpose better had it been written *not demonstrated*, instead of "not proven." Many facts can be proven which cannot be demonstrated. A fact is proven when sufficient evidence has been adduced to carry conviction to the mind of its truth, whether the fact can be demonstrated or not. Courts of justice recognize this, and act upon it. I may become thoroughly convinced of the fact that an insect has eyes, although I may not be able to demonstrate it by the observations of the microscope. I may become perfectly satisfied that an amœba has a digestive system, although Dr. Heitzmann cannot find any digestive apparatus with the microscope. He may deny that it has any nutrition because he cannot see any blood-vessels. I may become satisfied that the amœba has powers of locomotion, although no one should be able to see and define its *pseudopodia*. The trouble of the microscope in these cases is, that it cannot see function, nor the mental processes by which we become convinced that protoplasm exists by the nutrition of digested food, just as every other living tissue of the body exists; and we become convinced of this before the microscope has demonstrated the existence of a digestive system. The fact is proven, though not demonstrated.

So the astronomer proves the existence of a new planet before he can demonstrate it. He does it by a process of reasoning from observed facts,—facts already demonstrated. He knows well one planet in the heavens, and has studied its movements in view of others already known to be within its range of attraction. In tracing its orbit he has discovered an aberration which known forces will not account for. In studying it he brings mathematics into use, and calculates the exact extent of the aberration and the attractive force necessary to produce it. Having gained these facts by an intellectual operation, he uses his reason and arrives at the conclusion that in the direction of the aberration there must be another planet. No one has as yet seen it with the telescope, and because of this, some, who believe that the telescope is the only means of studying astronomy and not understanding the mental processes by which truth is discovered, will deny the existence of the planet because they have time and again pointed their telescopes into that part of the heavens and have never observed it. Twenty years afterwards comes the demonstration. The thoughtful and studious astronomer, who has calculated the time of the appearance, and therefore knows when and where to look, points his telescope in the right direction, and demonstrates to all observers what he had already proven by the deductions of reason.

It is very common for microscopists to assume that what appears to them in the field of the microscope is fact and certainty, and to trust to no fact concerning material existence that they cannot see and demonstrate with it,—this, too, in the face of all history since microscopical observations have been given to the world. The past is full of change of histological notions, theories, and asserted facts concerning almost every tissue of the body, and to-day histologists of equal skill in the use of the microscope differ widely as to what may be seen through the instrument, and differ widely, also, as to their interpretations of what they see.

The inerrancy of the microscope can more readily be accepted than the inerrancy of the interpretations of microscopists. Their interpretations may well be questioned when found to be not in harmony with well-known physiological function and the law of physiological development.

Since John Tomes's and Huxley's remarkable discoveries and demonstrations of the existence of a fibril within and passing through the tubules of the dentine, the profession have pretty generally assumed that if the Tomes fibre was not itself wholly nerve-fibre, it at least enveloped a nerve-fibre, although Tomes

himself never ventured to affirm that he considered the fibre nerve-tissue. He did, however, say that, "When a fibre is broken across, a minute globule of transparent but dense fluid may sometimes be seen at the broken end." This is a phenomenon of the same character as has often been observed when a nerve-fibre is parted.

The various phenomena which have appeared to the observation of the dental operator have been interpreted in harmony with the idea that the fibre had nerve sensation at least; and, so far as I know, no serious doubts have been entertained by clinicians concerning the existence of nerve-tissue in some form within the tubules of the dentine.

Within a few years histological students and experts with the microscope have expressed the strongest possible doubt, amounting almost to a denial, of the existence of nerve fibrils in the dentinal tubes, solely on microscopical grounds,—that is, they cannot see them. Thus, this becomes an interesting field for scientific examination.

For a brief study of the nature of the pulp processes ramifying the dentine, let us begin first at the pulp end of the fibril and observe some of its relations to the pulp, so called; then pass to the other end of the tubule, where we find a peripheral distribution of the pulp processes.

I may be allowed to say, in this connection, that in the discussion before alluded to, both Dr. Heitzmann and Dr. McCausey misrepresented me in saying that I "maintained that the whole pulp is nerve-tissue." This is the result of great carelessness, to say the least, in hearing and reading what I have said and written on the subject.

I think there is no question in the mind of any reading dentist that, however well filled the central cavity of a tooth may be with blood-vessels, myxomatous matter, connective tissue, odontoblasts, and other tissue cells, there are also nerves and nerve-fibres ramifying the mass in all directions. These have been traced from the point of entrance—the apical foramen—into the body of the organ, and in every direction to its periphery and the wall of dentine enclosing the mass usually called the dental pulp.

The question in doubt concerns the termination of these nerve-fibres. Do these nerve-ends turn backward in loops and inosculate with each other? or do they enter the odontoblast layer and become lost in the connective tissue? Thus their endings would nowhere be found. Some say that they have traced them into the individual

odontoblasts. Others think that they make their appearance beside the odontoblasts and between their projecting processes.

Some assert that they can trace them through the odontoblasts and to the entrance into the tubules of the dentine, but no further. There they lose sight of them.

Gray says, "The caudate or stellate nerve-corpuscles have tail-like processes issuing from them, some of which terminate in fine, transparent fibres, which become lost among other elements of the nervous tissue."

Bödecker says, "The dentinal fibres lie between the odontoblasts," then adds, "Franz Boll saw the nerve-fibres becoming axis cylinders between the odontoblasts, and in some instances he has followed them into the dentinal canaliculi." "Although I can furnish no direct proof," says Bödecker, "yet I regard the prolongation of the nerve-fibres into the dentinal canaliculi as certain."

Klein, in the "Atlas of Histology," says, "The assertion of Boll may be correct, that the non-medullated nerve-fibres ascend into the dentinal canals."

J. L. Williams says, "My studies of the pulp-tissue have led to the discovery that the odontoblasts are probably of the nature of multipolar ganglion cells. The odontoblasts are composed of what is essentially neural matter."

Boll writes, "That at least one of the processes of a multipolar nerve-cell does not branch, but becomes continuous with a nerve-fibre."

Dr. McCausey says, "The odontoblasts are protoplasmic bodies; that their processes are continuations of the body, and may be traced into the cap of dentine,"—does not believe that the processes are in any part nerve-tissue. Then observes, "If the pulp be a nerve, we shall expect to find it composed wholly of the elements which enter into the structure of nerve-tissue;" thus setting up a man of straw that he could easily tumble down, for neither I, at whom he aimed, nor any one else, ever took the position which he assumes,—that the pulp is *wholly* nerve-tissue, and that, therefore, the processes must be. All that is desired in this connection he fully maintains, and Dr. Heitzmann the same, that "The pulp, like other tissue, contains neural tissue of that form which enters into the structure of nerves whose function is the conduction of nervous influence,—medullated nerve-tissue."

Now we will again bring microscopical observations to our aid in learning the nature of the tissue at the other end of the dentinal tubes, which I and most others call the peripheral end of the den-

tine fibrils, although Dr. Heitzmann insists that the pulp itself is a peripheral organ.

This brings us into the region of the interglobular spaces of Czermak and their soft tissue contents. Here, too, we find a variety of opinions. Czermak himself scarcely ventured an opinion as to the contents of the spaces. John Tomes and Perpinge called it the "granular layer." Charles Tomes called it "transitional tissue," and again, finding bay-like excavations filled with soft tissue, he called it "protoplasmic cell-tissue."

Bödecker said that what Tomes saw was "basis substance of the dentine devoid of lime-salts."

John Tomes says that protoplasmic matter is enclosed within the loops of the dentinal fibrillæ; that he has seen the fibres pass entirely through the spaces and out into the dentine.

R. R. Andrews speaks of "large nucleated bodies in the cementum, larger than the odontoblasts, whose function is the forming of the cement cells, having processes, some of which run in the direction of the termination of the dentinal tubes, as though connected with them."

Wedl called the soft substance in the interglobular spaces "amorphous substance."

Let us sum up now what we have found at the extremities of this delicate fibre, the so-called dentinal fibril. We find at one extremity, in the body of the pulp, mucoid substance, protoplasm, myxomatous matter, nerves, nerve-threads and fibres in great number, connective tissue and connective-tissue cells, multipolar cells, vesicular nuclei in the peripheral cells, and neural tissue of that form which enters into the structure of nerves whose function is the conduction of nervous influence. We have then, in the pulp, all the functional organism and all the material needed for the construction of nerve-tissue.

At the other extremity, according to the histologists named, we find transitional tissue, protoplasmic tissue, embryonal tissue, basis substance of dentine, nucleated bodies, and amorphous substance.

Here also at the peripheral extremity we find the same embryonic material, the same unorganized material as at the pulp end; so that if there is not nerve-tissue in the dentinal tubules, it will not be for want of functioning power or embryonic material at hand to be metamorphosed into nerve-tissue.

Now let us leave for a while the microscopical aspects of the case and turn our attention to the demands of physiology,—not decide the case on the testimony of microscopy alone.

Physiology teaches us that every organ of the body, great and small, every functioning part is brought into the exercise of its function by the nervous system acting as an excitant; that for this purpose minute threads and fibres of nerve ramify every tissue of the body, and cause all the functional activity of all the organs; that harmony of action is absolutely essential to completeness of the organism as a whole. When, therefore, we are told that there is any part of the organism not penetrated by nerve-fibre, and yet performs a function, physiology responds in the negative.

We find that the odontoblasts on the pulp-periphera are active workers, are builders of the dentine. According to physiology, they perform this function under the stimulus of nerve influence, which acts by presence and contact. We find that these dentine-building organs have processes which are developed as the work progresses. We find, also, that the functional work of the odontoblasts is carried on with equal facility at the extremities of their processes and at their bases. From a physiological stand-point, therefore, the only rational conclusion we can reach is, that there is nerve stimulus at the terminal ends of these processes, be they long or short; and if so, the fibre of nerve must have travelled the length of the dentinal tube during the dentine-forming stages to reach that terminal end to stimulate its functional work. That functional work of the pulp processes is being performed all along the line up to and beyond the mature age of the individual.

Let us now learn what physiology has to offer to supply this demand for nerve influence through such fine working threads of tissue as the pulp processes.

I wish, first, to call attention to a few axiomatic facts. All the physical force of the body, all the manifestation of functional activity, is generated in and applied by the nervous system.

For the performance of all the varied functions of the human body, the nervous system offers but one kind of tissue. That is to say, there is no difference in the nerve-tissue of the different classes or pairs of nerves that proceed out from the brain, whatever the organ they reach or whatever the function they stimulate. Nerve-tissue exists, however, in different forms, such as vesicular, tubular, and fibrous, held in place by the everywhere-present connective tissue, with possible exceptions,—the amount of connective tissue having its maximum and minimum according to the size and strength of nerve-tissue demanded by the function.

For physiological study, a convenient division of the nervous system is made into *ganglia*, *nerves*, and *nerve-ends*.

Too little has been said of the nerve-ends, probably because so little is known of the nerve-endings. It will not answer, however, to say that they end nowhere,—that their endings are *lost* in the tissues. Microscopically it may answer to say that they run out into nothingness and are lost, but not physiologically. They may be lost to the sight of the microscope, but not lost to physiological function. It is the nerve-ends that take the impressions of sight, sound, and feeling.

It is well known that nerve-filaments do not branch except at their endings. Bundles of fibres may branch, and the individual fibres become brush-like at their endings, where the force generated in the ganglia is expended in producing functional action.

The peripheral regions of the body and of the various organs of the body are literally filled with nerve-ends in the form of plexuses and minute ganglia. Now let me ask, Do not the filamentous plexuses under the enamel, formed by looping and decussation, seem and act, physiologically, altogether like nerve-endings?

Nerve-fibre has an ending somewhere, and that, too, as a very important part of the nerve system, a depot of nerve influence. Every railroad track has an ending somewhere, and at that ending there is a station, where are performed the various functions of the road. Microscopists take us into the grand union depot of the pulp, from which there are roads leading out in all directions; take us out through the odontoblast-yard; take us through the gate into the tunnel of the tubuli, then say, "Here the track ends, with no station in sight; you must get through the tunnel to the depot at the other end, in the interglobular spaces, by other means than a railroad track of nerve-tissue." The nerve-fibre apparently ends in the darkness, yet with no suitable termination, such as we have a right to expect.

We have now to meet the microscopical objection that this connecting link between the central and peripheral depots of nerve influence is not nerve-tissue, or not known to be nerve-tissue, although all the functions of nerve influence are carried on at each end, with evident communication between the two.

I made this issue before the Odontological Society of New York City that, if this teaching of physiology that there is a nerve connection between the peripheral region of the dentine and the central organ of the tooth be not accepted, it is incumbent upon those who do not accept the teaching to name and demonstrate the existence of some other tissue that cannot only simulate nerve effects, but actually perform the functions of nerve-tissue.

Dr. Heitzmann accepted the issue and named *living matter*. I considered this a complete evasion of the question. Of course, it is living matter. There is living matter everywhere in a living organism. Wherever there is life and growth there must be living matter. Then Dr. Heitzmann makes use of the most contradictory statements, like these: "The dentinal fibrillæ are not nerves." "Both nerves and muscle are living matter." "Nobody can tell the difference between pure living matter and nerve-tissue." If that is true, by what stultification of his understanding can he affirm that the living matter of the fibrillæ is not in some part nerve-tissue?

Dr. Sudduth, also, accepted the issue and named protoplasm, and gave his reasons for supposing that protoplasm might in the economy of nature be substituted for nerve fibre. He had experimented with protoplasm and the *amœba*, and found that when touched with the point of a needle they would contract,—would show signs of conducting sensation. Dr. Allan and others have considered this ample evidence that protoplasmic threads might account for the conduction of sensation through the dentinal tubes to the pulp.

Dalton tells us that muscle-fibre will contract in the same manner, and further says, "This contraction will take place under the microscope when the fibre is entirely isolated and removed from contact with any other tissue; showing that the properties of contraction and irritability reside in the fibre itself, and are not communicated to it by other parts."

The sensitive plant will contract in like manner. Touch one of its leaflets and all the leaflets on the same petiole will fold together, and the petiole itself drop downward. Does this prove or play the part of even the poorest kind of evidence that muscular or vegetable fibre might be substituted for nerve-fibre for the performance of the function of physiological sensation?

The mistake in these cases is in confounding irritability and contractility with sensation. The only evidence of irritability of organic tissue is the perceived motion of the fibre. In the conduction of physiological sensation there is no perceptible motion, nor is there any evidence that motion bears any part in explaining the philosophy of conduction of sensation. Sensation can only be manifested when and where there is unrestrained connection with the sensorium. Irritability may be manifested wholly disconnected from the sensorium.

These facts point to the conclusion that there is no other tissue

than nerve-tissue that has the property of conducting physiological sensation.

The question now very naturally and fairly arises, Is it not possible that microscopists are mistaken in their interpretation of what they see within the tubules of dentine, calling it protoplasm, living matter, mucoid tissue, jelly-like substance? in each case indicating that it is a structureless, unorganized mass of embryonic matter.

To call it protoplasm is to exalt mere embryonic tissue to the performance of the function of the most highly organized of the tissues of the human body.

Let us see now if we are not offered a better and a more rational interpretation which will harmonize the teachings of microscopy with known function. Physiology teaches that the only essential part of nerve-tissue is the axis-cylinder,—that the embryonic existence of the nerve is limited to this kind of tissue, and its terminal ends are limited in the same manner.

The loss of the white substance of Schwann and of all other coatings that surround the axis-cylinder, as the nerves approach their termini, has a fit illustration in the development of the vascular system.

In examining the course of an artery from its source to its peripheral endings in capillary vessels, you lose sight, one by one, of its four distinct coatings, the *tunica*, *elastic coat*, *muscular coat*, *fenestrated coat*, and find nothing remaining for the capillaries but the endothelial layer of cells simply “glued together by their protoplasm,” as Stricker expresses it. Under the microscope, therefore, arterial tissue will present a different structure at different distances from the heart.

The same will be true of the nerve-tissue in various localities. The connective-tissue coatings, existing for mechanical purposes chiefly, to hold together the delicate functioning tissue in parts where there is strain and danger of harm from accident, are not to be found in the tubules of the dentine, the walls of the tubes affording ample support and protection to the gelatinous fibre passing through the tube. With this loss of external tissue the internal fibre would appear like another kind of tissue, and take a very different staining.

Now let us look into the nature of this axis-cylinder. Dunglison says that “the white substance and the tubular sheath usually disappear as the nerve approaches its terminal distribution.” He also observes, “Neurine consists chiefly of albumen and a peculiar fat.” “The experiments of Brown-Sequard show that this form of nerve-matter conveys sensitive impressions.”

Cleland says, "The axis-cylinder is of albuminoid composition. What is most important for a student to understand is, that every nerve in the body has an albuminoid thread, while only some are enveloped in the substance yielding protagon."

Turner, of the University of Edinburgh, says, "Although, from the great delicacy of nerve-fibre, the axis-cylinder cannot be seen in the living fibre of a cerebro-spinal nerve, there are many reasons for regarding it as a structure existing in the living nerve, and not the product of a post-mortem change."

On the above testimony of high authority we learn that the only essential part of nerve-tissue is the axis-cylinder; that the axis-cylinder is the only part of the nerve that persists in the ultimate distribution of the nerve-fibres; that the axis-cylinder is a gelatinous albuminoid nerve-fibre often drawn out to extreme tenuity; that its glistening appearance renders it so strikingly like that of protoplasm and living matter that, on the authoritative opinion of Dr. Heitzmann, no man can tell the difference between pure living matter and nerve-tissue; therefore there is not only a possibility, but a strong probability, that microscopists are mistaken in their interpretation of the contents of the dentinal tubes. And inasmuch as no other tissue than nerve-tissue has been demonstrated to possess the function of conducting physiological sensation, and inasmuch as physiological function and clinical experience unite in declaring that the dentinal fibre behaves under all circumstances like nerve-tissue, there seems very little room to doubt the existence of nerve-tissue within the tubules of dentine.

ALVEOLOLOGY.

BY G. S. JUNKERMAN, M.D., D.D.S., CINCINNATI, OHIO.

ALVEOLOLOGY, from whatever cause, means simply perforation of the alveolar process. There may be one, two, three, four, or more perforations, and it would then be styled single, double, triple, quadruple, etc., according to the number made. The alveolotomy may arise in the natural process of disease in nature's effort to throw it off, or from the interference of the surgeon. Alveolotomy, when the result of the surgeon's interference, has perhaps always been performed for the relief of alveolar abscess. More skill is required in performing an alveolotomy than in lancing any other

kind of abscess. Abscesses usually manifest the point at which they wish to make their exits; the point for alveolotomy must be determined by the surgeon himself.

Alveolotomy may be performed upon any of the alveolar cavities of the thirty-two teeth; but any other than a single operation ceases to be practical; therefore that can best be performed on any one of the eight anterior teeth of both jaws. Upon these teeth the operation is made with the best results in the order named,—the lateral incisors, the bicuspid, the central incisors, and the canines. The operation is more often indicated in the upper than in the lower jaw, and is followed by better results.

The indications for alveolotomy always presuppose the presence of an abscess; but the operation is preferably performed at the termination of the abscess, or during its progress. The end of an abscess, it will be argued, is an alveolotomy performed by nature for the exit of pus. This is true, and nature's operation is the best indication for that of the surgeon. You cannot style that an alveolotomy where the surgeon dilates the opening already made by nature to remove the abscess and disinfect the cavity. It would be unwise to interfere by operation on cases of abscess where nature has not yet made an opening. The operation should be avoided at the abscess stage, as being only a means of inflicting additional pain, and in no manner accelerating the arrival of relief. The true operation of alveolotomy is indicated when drainage is required, or in case of burrowing abscesses where the pus has invaded the soft tissue. The operation is most frequently indicated in abscess of the lateral incisor. So closely related is this operation and the lateral incisor that it might be called *lateral* alveolotomy. The oral surgeon cannot speak of abscesses of the teeth in one category. To the observing operator the difference of lateral abscess from that of any of the other teeth must again and again force itself upon the attention. It would be impossible to give statistics; but in every one's experience there must appear the fact of the frequency of these becoming abscesses of the hard palate. All abscesses of the hard palate arise from the lateral incisor. If your attention is turned to the anatomy of the alveolar process of the superior maxillary bone in the proximity of the lateral incisor, you will observe that the arrangement of the parts is responsible for this frequency of palatine abscess. In cases where the root of the lateral is not extraordinarily long, the wall of bony tissue posteriorly is thinner than anteriorly, or equally as thin as the anterior wall, and consequently the resistance of both walls approach an equality. There-

fore the abscess is as likely to make its exit posteriorly as anteriorly. With the central and the canine the case is different. The roots of these teeth extend further into the cancellous tissue, and the posterior walls become correspondingly thicker than the anterior. Knowing this anatomical fact, it only becomes a problem of physics to determine why these lateral abscesses result so frequently in those of the hard palate. If abscess of the hard palate be present, no matter how diverse the indications may be, it will be wise to always suspect the lateral incisor. This tooth furnishes the best case for an alveolotomy. Where the abscess has extended to the hard palate, opening it in this position does not furnish sufficient drainage. There is too much cancellous tissue and too great an extent of surface to drain by one opening. These are then the circumstances which indicate the perforation of the alveolus, by which a perfect drainage can be secured. The alveolotomy may be performed almost painlessly by the previous injection of cocaine. The perforation should be made at the apex of the lateral or as near to the apex as possible. A spear-shaped bur with rapid rotations of the engine should be used to perform the operation. Experience and the acquirement of skill are the only guides to discovering the exact position for the perforation. To sum up, then, the object of this paper has been to identify with surgery the operation which I think I have properly designated alveolotomy.

A NEW METHOD OF RUNNING THE SUSPENSION DENTAL-ENGINE BY THE ELECTRIC CURRENT.

BY T. A. FLETCHER, D.D.S., NEW YORK.

I HAVE applied to my suspension engine the Edison current on 110-volt circuit. The motor is placed on the top of my instrument cabinet, covered with an ebony case to match the cabinet. The shaft of the motor passes out on the wall side, with the pulley out of sight, and, being noiseless, attracts no attention. It runs with perfect steadiness. Just above the cabinet a set of pulleys is attached, over which the cord passes to a pulley suspended and governed by a cord and weight. This cord passes across the ceiling to the corner of the room. The cord passing through the suspended pulley is continued to the hand-piece. It will be observed by reference to the illustration that the hand-piece can be run at any angle and from either side of the chair.

The resistance-box is in the corner of the room. Double resistance is used,—the lower to govern the speed of the engine, and the upper for mouth-lamp and mallet.

The mallet best adapted for this system is the Gibbs electric mallet, represented in front of the cabinet.

The satisfaction which I have derived from this arrangement has led to the conclusion that it is the best way yet devised for the application of the electric current to the dental-engine.

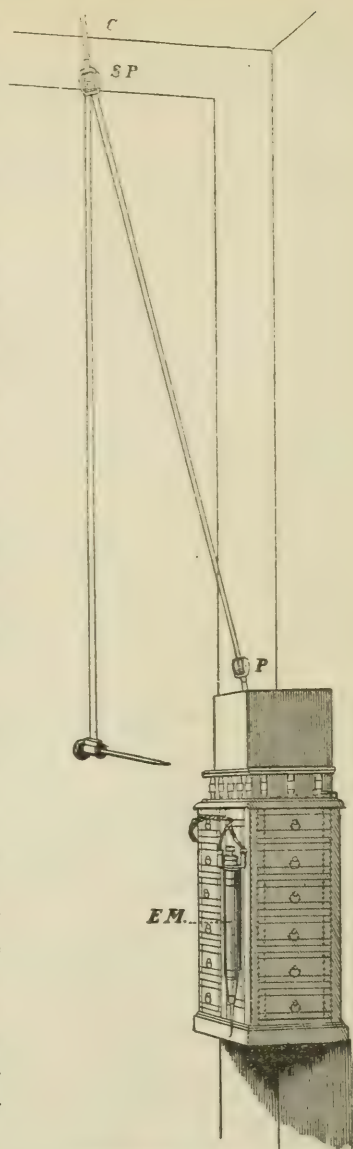
The mouth-lamp I use is of the Edison approved style. To this I have adapted a black rubber hood, and set the lamp in place with plaster, which serves the double purpose of a reflector and cutting off the heat, protecting the tissues for an indefinite period.

The starting and instantaneous device, also the reversal of rotation of my motor, are controlled by a simple pedal connection that can be placed under the chair.

During the time I have had this in use, it has not only given me entire satisfaction, but my patients express themselves more than pleased with the change.

Credit is due Mr. George M. Wheeler, my electrician, who has furnished me with his noiseless reversible motor and magnetic stopping attachment.

The workings of this arrangement can probably be understood by the illustration; but I will be pleased to exhibit it at my office, 67 West Fifty-fourth Street, New York City.



P, Pulley attached to wall above motor; SP, suspension pulley; C, cord attached to weight; EM, electric mallet.

Reports of Society Meetings.

AMERICAN DENTAL ASSOCIATION.

August 4, 1891.—First Day.—Evening Session.

DR. SMITH, the chairman of Section VI., "Physiology and Etiology," desires to present the following report:

"At the annual meeting two years ago, this Section was empowered to make an examination of prehistoric crania, and an appropriation of money was made for that purpose. At the last meeting Dr. J. R. Patrick was selected to act as curator of the proposed examinations. Partial examinations of collections of crania in Washington, Boston, and the curator's own valuable collection have been made. A brief report of the progress made in the work of tabulation will be given by Dr. Patrick. The members of Section VI. express the hope that the work already done will meet the approval of the members of this Association, when they shall have had an opportunity of examining the same.

"I should state here, perhaps, that the amount of money appropriated for this investigation, as you remember, was five hundred dollars, and fifty dollars of that sum had been used before Dr. Patrick began his investigation. Since then the whole sum has been expended, and I think there is a small deficit of about ten or eleven dollars over the sum appropriated. The Section, therefore, thinks that another appropriation for the continuance of this work would be proper.

"Dr. Patrick will present his report this evening, and then you will be better able to judge of the fitness of expending the money.

"We have also to report that the following papers have been submitted to the Section: 'Mouth-Breathing not the Cause of Contracted Jaws or High Vaults,' by Dr. Eugene S. Talbot, of Chicago; 'Physiological Action of Obtundents,' by Dr. L. E. Custer, of Dayton, Ohio; 'Diseases of Oral Mucous Membrane,' by Dr. Patterson, of Kansas; 'Dentition of the Felidæ,' by Dr. Alton H. Thompson, of Topeka (this will be read by Dr. Peirce); 'Phagocytosis,' by Dr. H. A. Smith, chairman of the Section.

"I would also state here that a paper was handed the Section

by Dr. Waters, of Boston. The paper was passed into the hands of Dr. Barrett, and I have not had a report from him; but if it be read, I would ask that it be by title only,—at least for this evening.

"After the reading of the short report on Dental Implantation, by Dr. Ottofy, I think it might be in order to ask Dr. Talbot to read his paper.

"The Section still continues its observations regarding the once popular dental implantation. At the present time the Section is prepared to make the following statements regarding the implantation of teeth:

"*First.* In properly selected cases, transplantation is successful for from three to five years.

"*Second.* No other operation in dentistry equals in length, beauty, service, appearance, and perfect comfort that of successfully implanted teeth.

"*Third.* No disease has ever been transmitted by implantation.

"*Fourth.* A combination of transplantation and implantation will often enable a dentist to make good use of a tooth lost by some cause. We believe the practitioner is justified in performing this operation in suitable cases."

MOUTH-BREATHING NOT THE CAUSE OF CONTRACTED JAWS OR HIGH VAULTS. ↴

BY DR. EUGENE S. TALBOT, OF CHICAGO.

Mouth-breathing was unknown to the early races, and is not observed among the present pure races nor modern civilized races. This may also be said of the deformities of the maxilla and teeth.

In an essay upon the subject of "The Influence of Adenoid Hypertrophy at the Vault of the Pharynx upon the Development of the Hard Palate," read before the New York Odontological Society, November 16, 1890, by Dr. D. Bryson Delavan, the author speaks of mouth-breathing as a cause of many deformities.

Other authors mention the fact, too, that sleeping with the mouth open produces tension of the buccinator muscle, causing the jaws to contract, and have suggested different theories by which that pressure brings about this peculiar form of deformity.

I will direct attention to a few facts as they have been presented to me in the constant study of deformity of the jaw and teeth for the past fourteen years, and you, gentlemen, shall be the judges

whether mouth-breathing has anything to do with contracted arches or not.

In the first place, let us consider the part involved. The superior maxillary bones are fused at the median line. The outer surfaces have upon their borders an alveolar process. The maxillary bones proper are made up of tense, compact tissue, and are so arranged as to best resist force. They are also for the attachment of muscles and the resistance of force in masticating food.

The hard palate does not assume the normal shape until the twelfth year, or after the teeth are all in position. The vault may be high or low, ranging from one inch above the margin of the alveolar process between the second bicuspid and first permanent molar down to one-quarter of an inch from the same point.

The alveolar process is made up of soft, cancellated structure, and is solely for the purpose of protecting the germs of the teeth before they have erupted.

From the time the teeth make their first appearance until they are finally shed, the alveolar process has developed and been absorbed three distinct times.

The buccinator muscle is composed of striated muscular fibres, and is therefore under the control of the will. Its function is for the purpose of compressing air in the act of blowing, whence its name is derived, and also for the purpose of carrying and holding the food under the teeth during mastication.

There are many cases of contracted arches where mouth-breathing does not exist. Mouth-breathing frequently commences very early in life. Contracted jaws, on the other hand, never commence until the seventh or eighth, and sometimes the tenth year. Contracted arches are of two kinds,—namely (Fig. 1), V-shaped and (Fig. 2) saddle-shaped. All the other varieties are modifications and blendings of these two kinds.

In the V-shaped arch, commencing at the first permanent molar, there is a gradual narrowing of the teeth and alveolar process towards the median line. There is also a protrusion of the teeth and alveolar process, and not the jaw.

In the saddle-shaped arch, the bicuspid are carried inward, and the deformity is invariably situated between the first permanent molar and the cuspids. The contracted hard palate is always associated with the V-shaped variety.

In mouth-breathing the lower jaw usually drops only sufficiently for the passage of the same volume of air as would pass through the nasal cavity, which is only about half an inch. Old people

often sleep with the mouth open, and frequently to the fullest extent; but this deformity of the jaw and teeth never occurs after the eruption of the teeth, say the twelfth or fifteenth year.

As to the buccinator muscle, it extends anteriorly to the first bicuspid only, and therefore it can produce no effect upon the V-shaped variety of deformity, in which is also found the contracted vault.

For years it has been demonstrated by dentists in regulating teeth, that it is very rare for the apices of the roots of teeth to move when pressure is put to bear upon the crowns of teeth for the purpose of regulating them. This being the case, teeth having no roots are less liable to move than teeth with short roots like the lateral incisors and bicuspids. Since in the moving of a tooth the greatest change which takes place is at the neck, it stands to reason that the greatest absorption and deposition of bone takes place at that point.

I have shown that the first permanent molar and the teeth posterior to that are never involved. I have also shown that the centre of the muscle in both directions is located at this tooth. How is it possible, since all the teeth are covered by the muscle upon one side, that half are carried inward and the other half remain normal?

Again, if mouth-breathing is the cause of contraction, both sides must contract alike, which never occurs.

The pressure of the tissue upon the crown of teeth is not sufficient to affect the alveolar process through the roots of the teeth, but even if it could modify those spongy structures, its force would stop there, and would not extend to the osseous vault, bending it out of shape.

The changes which take place in bone are not the bending in at one place and forcing out at another, but are an absorption and deposition of bone at the point of pressure.

It would be as impossible to produce pressure sufficient to break the dental arch as it would be for the weight of a building to break the arch of a door or window.

The V-shaped arch can never occur upon the lower jaw if the teeth articulate normally, because these teeth strike inside of the upper, and are thus prevented from moving forward. If we take three thousand models of the upper jaw, and arrange them in groups according to the forms here represented, and then examine very closely the arrangement of the teeth in each group, we will be unable to find any two alike in any group,—thus showing that any

external force acting upon the root from the outside could not possibly be the cause of contracted vaults.

The maxillary bone never protrudes in front in this class of cases. It is only the alveolar process which is carried forward by the projecting teeth. The only tissues involved in those deformities are the teeth, on the one hand, and the alveolar process on the other.

It would be useless for any one to say that mouth-breathing is the cause of one case of V-shaped arch in every twenty, and that some other cause produces the rest of the deformities. We must have a law which will work in all varieties of contracted arches.

The following table will explain the difference in the height of vaults both in normal and defective jaws:

Normal jaw, average58 of an inch.
Saddle-shaped arch, average60 " " "
V-shaped arch, average55 " " "
Semi-V and semi-saddle-shaped arch, average56 " " "

It seems, then, that what has been considered a change in the height of the vault in narrowed and contracted jaw is only an imaginary one, the contraction conveying the impression that the vault is much higher than it really is.

In order to strengthen further the views herein suggested, I have taken impressions of the mouths of a large number of mouth-breathers, and have secured models of the same.

Dr. Talbot then gave about forty illustrations of different cases.

DISCUSSION.

Dr. Watkins, New Jersey.—I would like to ask the gentleman if all these models are taken from the mouths of mouth-breathers?

Dr. Talbot.—Yes.

Dr. George J. Fredericks, New Orleans.—I was not here when the paper was read, but I heard the close of it. I think these measurements are to prove the difference between mouth-breathers and nose-breathers. Is not that the point?—that mouth-breathing has a tendency of changing the jaw?

Dr. Talbot.—I did not try to make any point. I made these measurements to see if there was a difference between contracted arches and high vaults of mouth-breathers, and I have shown by the examinations that the vaults are lower on an average in contracted arches than in normal arches.

Dr. Fredericks.—Has the normal arch been established?

Dr. Talbot.—I should think that six thousand four hundred cases ought to establish it.

Dr. Fredericks.—That is exactly the condition of health and disease; because, when you want to find what health is, then you are on a doubtful subject. It is something that you do not know. Where one man is considered healthy, in comparison with another he may be a sick man. It is the same in regard to the measurement of the roof of the mouth. If you take even six thousand four hundred cases, you cannot establish a normal condition, in my estimation.

Dr. Abbott.—I want to congratulate Dr. Talbot upon what seems to me a very successful outcome of his work in this direction. It seems very evident that he has established the one fact, that mouth-breathing does not produce the contracted arch. This is to me rather an interesting and a valuable piece of information. Although I am not in that line of study, I see more or less of it; and of course am very much gratified indeed at this paper, and the results of the work that Dr. Talbot has done.

Dr. Fillebrown.—I have one suggestion to make in corroboration of Dr. Talbot's paper. I think if any person present will drop his jaw down so that it is as wide open as any mouth-breather would have it, he would find that there is abundant room for the air to pass between the teeth. You will also find that the lower jaw lies far away from the teeth, and does not affect them in any way. When the cheeks are sunken in, from old age or from loss of the teeth, it is not because the teeth themselves are gone, but it is because the jaws drop together, thereby making the cheeks depressed. Consequently, I say that that circumstance is abundant proof that the pressure of the muscles on the maxilla does not tend to contract the arch in its lateral diameter.

Dr. Horton, Cleveland.—I have read many articles on the subject of mouth-breathing being the cause of contracted arches, but I think we can have nothing more conclusive than the refutation that has been made by the paper just read. I am happy to say that I believe the doctor has succeeded in perfectly overcoming the position that has been taken heretofore.

Dr. Watkins.—I understood from the doctor's paper that he stated that the contraction of the arch was not caused after the teeth had erupted. I would like to ask him if he has found that mouth-breathing was the cause of any contraction of the arch before the permanent teeth were erupted, or during their eruption.

Dr. Tulbot.—Being a graduate of medicine, I have had an opportunity to examine into the early causes of thumb-sucking and mouth-breathing, and I have found that babies sometimes breathe through their mouths within two or three weeks after their birth. Yet I do not think we see a case of contracted arch with the first set of teeth. We do not see contracted arches until the eighth year, and the contraction ceases after the teeth are erupted. It takes place from the time the teeth erupt, when they come through.

Motion here made that members of the profession from other countries be invited to take part in the discussions. Carried.

Dr. Peirce.—Mr. President, I must dissent somewhat from the conclusions of the essayist. I think he has misstated the case when he says that mouth-breathing has been considered the main cause for contracted arches. It has been considered one of the factors, and the statement he has made here this evening certainly is an argument in favor of that. The fact that deciduous teeth are never contracted by mouth-breathing is simply due to the fact that the mouth is shaped in early life, and the teeth that are being erupted are short, and there is little mechanical force brought to bear upon them, so that they cannot be forced into the jaw during their short period of development. He stated also that the mouth changed, or became contracted, from eight to twelve years, and that is the period that these bicuspid teeth, which are among the longest teeth we have, are gradually coming down, and the pressure brought upon those teeth by the cheeks does have a tendency, while they are being developed, to force the crowns a little into the mouth, and hence produces a narrowed arch.

The fact that the change never occurs after twelve years shows that the development has taken place while the teeth were being erupted, so I simply claim that this mouth-breathing, or the fact that the mouth is kept open while the child is at rest, is one of the factors in forcing the sides of the mouth together. He says if this were the cause, that both sides would be influenced alike. Not necessarily, because the pressure may be greater on one side than the other. On one side the child is lying, and on the other is the weight of the cheek. There is always a difference in weight. Because the result is not the same on both sides, it seems to me, is not an evidence that there is not some influence of that kind at work. The evidence that has been produced in favor of it is what he has stated to-night,—that from the ages of eight to twelve years is just the period that the change takes place, and only then; and that is the period when these bicuspid teeth are being slowly developed.

Dr. Horton.—These departures from the normal shape of the mouth are confined mostly to the cultivated races. I would state that they are very much more rare among negroes than among whites in this country. It is a comparatively rare occurrence to find a negro with a high or deformed arch, or with irregularities of the teeth even; so that I take it that the doctor's observations are correct, and I wanted to emphasize that single idea in his most excellent paper. I may not have understood, as my hearing is a little dull, the reading of the paper thoroughly. If I did, he undertook to say that the alveolar processes were developed, and that their office was to some extent to protect and cover the germs of the teeth. I think alveolar processes never make their appearance until the crowns are free from the bony structure in their development, and that the alveolar processes are developed with the growth of the root of the tooth. The alveolar processes are not developed, except as the root of the tooth is developed.

Dr. Truman.—I would like to ask Professor Peirce this question. If the bicuspid from eight to twelve years of age are liable to be drawn into the mouth by the action of the buccinator muscle, why is it that the deciduous molars are not drawn in? And if a deciduous molar is drawn in, why of course it will drag in the permanent bicuspid as it is developed between the roots of the deciduous molar teeth. Several years ago I took the same position that Dr. Fillebrown does, that it was impossible for those muscles to act upon the teeth and contract the arch, and I am gratified to-night to find that this very absurd theory of mouth-breathing producing these irregularities has been settled for all time.

Dr. Peirce.—I simply would state that, looking at it mechanically, the deciduous molars are very short, and they are very quickly erupted, compared to the length of time that the bicuspid are occupying their permanent places, and therefore there is not nearly the mechanical influence brought to bear upon deciduous molars that there is upon the permanent bicuspid. Now, if the argument brought out by the doctor in his paper this evening be correct, then we would suppose that softening of the muscles of the cheek would have no influence; yet I am certain many gentlemen have seen a slight aneurism on the cheeks that has forced the bicuspid and the molar on to the palatine surface. I have had two cases of that, and one a very marked one, where the aneurism of the cheek was as soft as it could be, and yet its presence did displace those teeth.

Dr. Abbott.—In reference to the development of alveolar processes,

the formation begins at the time of the development of the crown, and when the crown of the permanent tooth is fully formed, the alveolar process is in considerable growth. This I have observed in many cases.

Dr. Patrick.—Mr. President, I have very little to say in regard to Dr. Talbot's paper, only so far as measurements are concerned and averages. Now, I have always admired energy,—even the energy of a squirrel in a cage; but the utility of that energy spent in that direction I never could admire. Averages are not scientific facts. They are speculations. You take ten thousand measurements of any portion of the human body. You divide it equally between each one. You have then an average. The very moment you make one more such measurement, you destroy the whole average! Take one thousand human superior maxillas and measure them; find the average. You take one more, and that either measures a little more or a little less, and the average is useless for any purpose whatever. Then I object to the manner in which these measurements have been made, irrespective of race, irrespective of what people they belong to. You do not even get an average of one single race of people. One more measurement, and the whole fabric is upset. One instance of a large jaw or a small jaw destroys the whole thing.

Therefore an average is not a scientific fact. It answers a purpose in some instances for speculation; for instance, the life insurance agent can deal with averages,—the average age of man; but he leaves an immense margin in taking a risk. It is not scientific; it is speculative. It is gambling on the life of man.

That is not all. While an average is not a scientific fact, it is worse, still worse. It destroys individuality. It is destructive of the study of individuality. It puts aside and renders classification impossible, if you take an average for a guide. Men have tried that for the past one hundred and fifty years in scientific matters, and have always abandoned it. I shall not occupy your time by reciting prominent instances of it.

Dr. Morton, one of the most energetic, well qualified, thoroughly educated Philadelphia gentlemen, says it is a speculation. Dr. Morton made a splendid collection of primates. He spent his whole life and energy in establishing it. He deserves to be called the father of primeology, if it ever becomes a science.

So much for averages. So much for measurements. Measurements are very useful. I will not gainsay anything that mensuration will do. Engineers would be lost without it, but where it

tends to averages, it amounts to nothing. Where it tends to mark the bounds of individuality, it is valuable, because it gives you the true key to classification.

A celebrated writer has discovered a system of measurement of the human body for the purpose of identification of criminals. The system of measurement rests on the fact that there are no human beings on the face of the earth who are exactly alike. That is why it is valuable; so that if he measures one individual, he can always be identified from the single fact of the dissimilarity of all others. It is valuable in no other sense. Its great value rests on that fact. There are no two human beings, even of one family, who are exactly alike. In taking the measurements of enlisted men, it is a good thing to use that method to recover deserters; but still they may disfigure themselves afterwards.

Dr. Talbot.—I will not attempt to answer Dr. Patrick at this time. I will take him when he reads his own paper. I want to speak of the remark made by Dr. Peirce, that the greatest contraction is at the second bicuspid tooth. If the buccinator muscle is the cause of that, the first permanent molar must be involved, because it involves the wisdom tooth; but we rarely find the first permanent molar involved in a contracted arch. Now, it would be impossible, in Fig. 4, for the muscle to produce that style of irregularity, because it could not bend sufficiently to produce that form. Again, if mouth-breathing were the cause, the first teeth would necessarily be involved, because the very point he makes shows that, the teeth being smaller when the alveolar process is in its constructive stage, the temporary teeth would be involved; but we never see it, and therefore it would be impossible for the buccinator muscle to produce contracted arches.

Dr. Peirce.—I did not say a word about the buccinator muscle. I said the tissue lying over the teeth.

Dr. Talbot.—The tissues could not be involved at all without there being a muscle that produced it. The mucous membrane could not contract.

Dr. Patrick then read the following report:

Mr. President, I have the honor to report the following: The work of examining the crania was intrusted to Dr. Andrews, of Cambridge, Massachusetts. He found it expedient to employ Mr. Newton, a physiologist, to assist him. Mr. Newton is a young man, a student. He found it necessary to devote his whole time for one month to the examination. The work has been carefully and faithfully performed by Mr. Newton, and vouched for by Drs.

Andrews and Knight. The following crania of different races were examined :

Peru	504
Terra del Fuego	1
Mexico	10
Stony Grove Indians	154
California Indians	191
Nicaragua	816
Guatemala	1
Mexican	2

The work of examining and tabulating the crania was intrusted to Dr. Peirce, of Philadelphia, with the assistance of Dr. Ives. They have examined one thousand and six human crania, which completes the work on the collection of crania in the Academy of Natural Sciences, Philadelphia. The work of examining the Patrick collection now in the rooms of the Historical Society at St. Louis was performed by Drs. McKellops, Fuller, and Wick, of St. Louis. The crania were taken from a burial mound situate in St. Clair, Madison County, Illinois. They number sixty-nine. A small collection of forty human crania has been examined and tabulated by Drs. Ottoby and Davis, of Chicago. The record of the finished work now in my possession was returned too late to make a report in regard to the condition of the teeth and jaws of the several collections. The collection in the Medical Museum has a record of one hundred, making a total of two thousand and ninety-six.

I wish to state here that all of these records were returned to me within a few days of my leaving for this place. Of course it was impossible for me to make anything like a report of the physiological or pathological condition of the jaws and teeth as recorded, but I think that I would be able, if you will allow me to do it, to make a record of what I have now on hand, in time for publication in the transactions of this society. I propose to give the record in such a manner that it would be read. I would take each race of men and give the condition of each skull in each race, so you could read it straight along without referring to tables. This is one of the records. (Exhibiting same, and passing it around for examination.)

There are one hundred in each volume. I have made provision for the tabulation of ten thousand. I do not think it would be more than half enough. I have quite a number of gentlemen from whom I have not heard. I expect to receive letters from Washington City shortly, calling my attention to other collections,—private ones.

Outside of the United States I have had several letters from people who are willing to work for the American Association in this investigation. Among them are Dr. Mitchell, of London, Dr. Ernst Shoeber, of Stockholm, and Dr. Van Marter, of Rome, Italy. There are a number of others, but I have not made any arrangements with them yet. I sent to the Peabody Museum, which was founded by Peabody at the instigation of his nephew. I think they will have, before we get through with this investigation, the largest collection in the world, and the classification is better than any I have met, because it is classified according to the geography of the country they were taken from.

It would be necessary, in order to prosecute this study properly, to compensate some of the gentlemen who do this work. I think it is wrong to expect them to do it for nothing. One or two men who are deeply interested made the suggestion that they would use their own assistants, knowing that they could not spare the time themselves. A man must take some one with him to assist him in carrying the skulls to and from the cases to the tables, and those assistants must be paid. Probably that would be Dr. Smith's part of the report. I want to say that before we meet again I will have a circular out in every State that has a State society. The Missouri State Association has already contributed fifty dollars; Georgia, twenty-five dollars, and so on; so far as I have heard from them, and so far as I have asked, none have refused.

Moved that the report be accepted as a report of progress.
Carried.

PHYSIOLOGICAL ACTION OF OBTUNDENTS.

BY L. E. CUSTER, DAYTON, OHIO.

This paper has been written with a view of making clear and harmonizing a few conflicting ideas regarding the action of obtundents of sensitiveness of the dentinal fibril.

Owing to conflicting theories, it will be fair to assume that this tissue, whose sensibility we desire to obtund is of the nature of simple protoplasm, with (in this instance) an exalted sensitive function. It contains albumen, and this is therefore coagulable; it is made up largely of water and may be desiccated; it is encased in a tube, and when it does not entirely fill this tube, a fluid fills this space. This fluid may be removed, and the temperature of the fibril may be reduced. These are the conditions upon which we are to work.

The dentinal fibril does not possess a blood circulation, and on that account the nutritive movements are slow; so slow, that any agent, which produces local anæsthesia in other parts in a few minutes, will be very slow in acting to any depth in the dentinal fibril, —so slow, indeed, that we need hardly look in this direction for a practical agent. Cocaine, as a typical representative of this class of agents, has not been effective for this reason.

Any agent which is to act upon the sensitive function of the dentinal fibril must be more powerful than cocaine; it must not coagulate albumen; it must have an affinity for water; it must possess a penetrating property and insinuate itself into the tubule, for it will not be carried in by circulation, and but very slowly by any nutritive movement. Until we find an agent possessing these qualities, we need not expect to obtund sensitive dentine by suspending the fibril's irritability.

The most satisfactory results have been obtained in other directions. The dentinal fibril has a definite composition. All the proteids are in a definite proportion, and we have reason to believe that the proportion is very delicately balanced. If the structure of the fibril be changed, its irritability ceases, and it can no longer communicate.

The change of structure most easily accomplished is the coagulation of its albumen and the withdrawal of its water. If the albumen is coagulated, it is as effectual in checking neural movement as though the albuminous ingredient had been withdrawn; indeed, the coagulation of albumen itself renders it harder, and its presence would prevent any exhibition of life more readily than if it were removed.

The coagulation of albumen, unless produced by heat, is somewhat self-limiting, so that, since heat of 160° F. is not allowable for sensitive dentine, the action of present known coagulants is not entirely satisfactory. Before coagulation can be a practical success, we must have an agent which penetrates to some depth.

Penetrating escharotics, such as arsenic and the like, since they burn the tissue beyond recovery and endanger the pulp, should not be considered. The other method of changing the structure of the dentinal fibril is by the removal of the water.

The water is in a twofold relation with the fibril, that which is a constituent of the fibril itself, and that which fills any inequalities between the fibril and Neuman's Sheath. One is a constituent, and the other a condition.

The water, which is a constituent, is always present; it is

always found where there is life and motion; it is always a necessary condition for neural activity; it makes up three-quarters of the entire body, and about ninety per cent. of the dentinal fibril. Constituting such a large proportion of the fibril, it is evident that there would be a proportionate change in the structure and physical character if the water were removed.

The size would be decreased; the albumen, if coagulated, would become harder, and in this desiccated condition it would be practically dead, incapable of performing nutrition and function.

The water which fills any inequalities between the fibril and its investments may be accessory in the transmission of sensation. In this relation, it may transmit vibrations to the fibril or even to the fibriloblast.

One of the most delicate nerves of special sense—the auditory—receives its impressions through the endolymph in which its terminals float, so, if the water surrounding the fibril should be removed, the fibril's transmitting power may be affected.

The watery contents of the tubule are withdrawn by evaporation, and by bringing an agent in contact with it for which it has an affinity. Evaporation is produced by raising the temperature and subjecting the fibril to a current of air. This is practically accomplished by the repeated blasts from a hot-air syringe.

The water surrounding the fibril is comparatively easily abstracted, but to loosen the molecular grip in the fibril itself requires no force.

There are many agents which have an affinity for water, but not all are suitable for use in the cavity of a tooth.

As compared with coagulation as a means of changing the structure, dehydration is more thoroughly accomplished with the present known methods, and hence the results are more satisfactory; so much so, that I suppose the majority of operators use dehydration almost entirely as a means of obtunding sensitive dentine.

We have an agent which, when used on sensitive dentine, both withdraws the water and coagulates the albumen, and a more effective single medicament for sensitive dentine we have not. I refer to chloride of zinc,—not a fluid when its affinity for water has been satisfied, but a crystal which will deliquesce when placed in the cavity.

The last method by which the fibril-transmitting power may be lessened is by changing the temperature. Of all the obtundents of sensitive dentine, extreme cold is the most effective; not that it is any better than perfect coagulation or dehydration, but because the

temperature of dentine may be reduced more thoroughly than the albumen may be coagulated or the water withdrawn in ordinary practice.

The reduction of the temperature is best accomplished by the use of volatile agents, such as sulphuric ether, chloride of methyl or nitrous oxide.

It will be observed that the fibril's function may be completely suspended by coagulating all the albumen, by withdrawing all its water, or by lowering its temperature to a certain point. Entire coagulation of its albumen is practically impossible at present, the entire removal of its moisture almost impossible, and the reduction of temperature is the only one which acts to any desired depth.

Recently there have been introduced three new methods, having the same principle of action, which are misleading,—viz., the thermal obtunder of Small, the Milton obtunder, and the Richmond obtunder. These are instruments and methods which use an elevation of temperature, and the vapor of an alcohol or any essential oil, or a combination of these, upon the dentine. The effect of throwing a blast of hot air upon a tooth is to heat it. By heating the tooth, evaporation of its dentine takes place. The fibril is drying up, and there is an outward movement as the water vaporizes and escapes from the tubule.

The application of a vaporizing agent in a warm or hot place is essentially one of desiccation. The heat is the only virtue in this, unless the agent has an affinity for water, when it may aid in carrying off the water vapor. The vapor of alcohol is effective on this account, and I think those who have recommended the use of oils or any agent which has not an affinity for water are laboring under a delusion.

Unfortunately, the agents which are most effective are most dangerous to the pulp, and in our selection of an agent for the case at hand this is to be borne in mind.

The Chairman.—Gentlemen, before adjournment, a little miscellaneous business has to be done. The chairman will announce the committee on necrology:—J. Taft, Louis Jack, George W. McElhaney, Frank Abbott, and Eugene S. Talbot.

Also the committee to fill the vacancies on the examination of the books of the Dental Protective Association, in place of Frank H. Garner and J. P. Wilson:—L. D. Shepard and H. A. Smith.

Adjourned.

HARVARD ODONTOLOGICAL SOCIETY.

THE Harvard Odontological Society held its regular monthly meeting, April 30, 1891, at Young's Hotel, Boston. The President, Dr. J. E. Stanton, in the chair. Dr. Harold C. Ernst was the speaker (impromptu) of the evening. Subject: "A Few Words in Regard to the Sterilization of Instruments."

(For Dr. Ernst's paper, see page 741.)

Dr. Potter.—This is a subject about which I have given considerable thought from the very first of my professional work. It has, however, always been somewhat perplexing, even though consulting the current authorities, to be quite sure as to what processes or chemicals had a true germicidal action. And I am particularly pleased to-night in getting so much reliable information direct from the laboratory. For it is upon laboratory experiments that we must rely if we want to know with certainty as to the value of germicides. As to Dr. Ernst's methods, I have in a way practised them for some time. I should like to ask him a few questions. In the first place, What is the temperature of the Arnold sterilizer? If the steam is to any extent kept confined, the heat must rise above 100° C. Secondly, after the steam is up, how long a time must instruments be submitted to its action in order to be thoroughly sterilized? Thirdly, would the addition of a potassium solution to the water control to any extent the matter of rust? We know very well that in boiling instruments the addition of liquor potass. prevents their rusting, and my query is, Would the same substance have any influence in an Arnold sterilizer?

My own practice has been in the care of instruments to boil such of them as could not be injured by boiling, and to submit others, as chisels and excavators, to a ninety-five per cent. solution of carbolic acid. Acid of this strength does not rust instruments as do the weaker solutions. The Bunsen burner I have used extensively on certain instruments which could be exposed to its flame without material injury. How to sterilize a mouth-mirror is still an unsolved problem to me.

Dr. Taft.—I should like to ask if a thorough cleansing of all instruments with soap and water with a good brush will not accomplish sterilization?

Dr. Niles.—I am very much impressed with the necessity of sterilizing our instruments. The difficulty seems to be to get at it conveniently as we are engaged in going from one patient to

another. Of course, we may have two sets of instruments, and while operating upon one patient, our assistant can sterilize the instruments that we have used in the preceding case. But it is necessary that this should be done quickly and conveniently near the chair, and the process continually going on. I have thought of getting an oven. An idea has occurred to me to-night that possibly we might simplify the matter by using hot oil, or carbolized oil, or carbolized glycerin. We can attain a higher temperature in these mediums, and the instrument simply dipped for a few moments in a very small vessel, which might be arranged near the chair over a Bunsen lamp, it seems to me would accomplish what is desired. The idea, as I understand it, is to get a sufficiently high temperature to destroy germinal life. Water might boil away; if hot oil be used, we would avoid rusting the instruments.

Another interesting point brought out by the professor is in relation to the germ found in the mouth called the micrococcus of sputum septicæmia. I should like to ask him if these germs are found in every mouth? He speaks of people who have been bitten, and the wounds have been very hard to heal; and I thought possibly this germ may have something to do with the very obstinate affection of the gums usually known as pyorrhœa alveolaris, or Rigg's disease. If these are present in all mouths and in a normal condition of the mouth, is not their presence dangerous, or active in the production of these pus-discharging sockets of teeth?

Dr. Giblin.—Is it necessary that there be a lesion—an abrasion of the mucous membrane—in order that bacilli become dangerous in the mouth?

Dr. Werner.—To me the mouth-mirror is the instrument *par excellence* accountable for carrying infection from mouth to mouth. Many a dentist will wash his excavators, his chisels, and minor instruments, but the mouth-mirror will be most neglected. What shall we do with it? Will the essayist instruct us as to the germicidal properties of creolin?

Dr. Stoddard.—I would like to ask Dr. Ernst if electricity has been used in sterilizing instruments, and if so, how powerful a current is necessary?

Dr. Potter.—If alcohol is good for anything as a sterilizer, I have here a mirror which has been for many hours submerged in it without doing any damage.

Dr. Werner.—We must not forget our napkins, which may be a great source for conveying disease from one mouth to another. Dental napkins are a great source of annoyance to many cleanly

patients, and I presume washing is not a very efficacious way of sterilizing them.

Dr. Taft.—If the system is in a condition of perfect health, are not the bacilli of tuberculosis, syphilis, septicæmia, and various other infectious diseases, rendered inoperative? It is well known that we are full of bacteria of one kind or another, and when the system is in a condition of perfect health, we are not aware of their existence to any alarming degree, but the moment the vitality becomes lowered, these bacteria become effective and work injury. Otherwise, why is it not fair to presume that our patients are being constantly inoculated with the various forms of bacilli?

Dr. Ernst.—Mr. President, I will, as far as I can, answer the questions in the order in which they have been asked.

Dr. Potter asks about the temperature and the length of time which the Arnold sterilizer should be used, and the effectiveness of a solution of potash for preventing the rust. The temperature obtained is about 101° to 102° C., the steam being slightly under pressure. That pressure is increased if the heat is increased and the steam given off more rapidly, but that is quite enough. The time for exposure for complete sterilization need not and does not extend over fifteen minutes after the steam has begun to pass; twenty minutes gives us an ample margin. The effectiveness of a potash solution is unquestionably very great, and there is no reason why it would not work just as well in the Arnold sterilizer as in any of the ordinary forms of steam-bath.

Of course, in what I have said to the Society this evening I have generalized, because I have realized that the means must vary according to the circumstances, and, on account of the difference in circumstances, no definite lines of procedure can be laid down.

Dr. Potter also spoke of carbolic acid, and, as he says, it is very effective if used in sufficient strength and for a sufficient length of time, having only the disadvantage that other chemicals may have, —the smell,—which renders it objectionable to most patients, and particularly if used in the strength of which Dr. Potter speaks.

The use of the naked flame of the Bunsen burner is as effective as anything can be, provided the instruments can stand it, but there are very few that I know of that can stand a Bunsen flame for a sufficient length of time to complete the sterilization. It would be necessary to heat the instrument almost to a red heat every time, and that, of course, if repeated often, will spoil the temper of any instrument.

Alcohol is not a germicide, it is an antiseptic only. That can be proven by the immersion of small pieces of tubercle in alcohol.

While in the alcohol the bacteria remain inactive, but on removing them and washing with water, they resume their activity. The use of alcohol as I have employed it myself in cleansing instruments—such instruments, for instance, as syringes which have been used for injections—is entirely for washing away traces of carbolic acid,—not at all as a germicide.

Dr. Taft asks why soap and water are not sufficient. It is sufficient for cleaning away dirt, but it is not sufficient for the destruction of bacteria,—they are simply diluted, but not destroyed, and wiping does not remove them with certainty. The same objection is to be brought against cloth, which will polish the instruments more or less, but does not clean the small corners, and any minute particle that may be present there might be sufficient to cause a great deal of harm. The portion that is necessary for the production of pathological change is inconceivably small, and may readily lurk in the corners of the burs of the dental-engine, and require the aid of the lens to see them. The rubber is simply good for polishing, and, like the soap and water, and the cloth, does not remove the bacteria from the interstices of the instrument.

The objection to carbolized oil or glycerin in my experience is that it very soon fills a room with such fumes that it is impossible to live in it. I have attempted to use it in my laboratory, which is a room larger than this one, and found that I would have to open all the windows or go out myself. The effectiveness of sterilization is very perfect. Dr. Niles also spoke of the evaporation of the water. In the Arnold sterilizer the water does not evaporate, so that you can use it all day long without renewing the water. The apparatus is easy of manipulation, and is quite small, so that it can be conveniently employed for your purposes. The question as to the causation of pyorrhœa alveolaris by the micrococcus of sputum septicæmia is a pertinent one, but it is not yet settled. The probabilities are that that form of suppuration is produced by one of the ordinary suppurative bacteria, and not by this micrococcus of sputum septicæmia. The organism does not occur in everybody's mouth and at all times, and yet it is likely to be found at almost any time. Exactly what laws govern its appearance or disappearance are not yet made out.

The question was asked whether an abrasion was necessary for the inoculation by the various bacilli. It is true that an abrasion of the mucous membrane is necessary for the local infection of the patient, but the presence of the rubber dam does not by any means prove that all of the infectious material is excluded from the mouth.

The mouth-mirror seems to me to be an offender, from my own experience. I have suspected, what has been said this evening, that it was not cleaned quite as thoroughly as it should be. One suggestion that I would make is that the handles of the mirrors should be made of a solid piece of steel. The added weight would not count for much, and the ease of taking care of the instrument would more than counterbalance it. They could be sterilized either in the sterilizer or in carbolic acid, but whether that would injure the silver on the glass I do not know. If that be true, it seems to me a matter of very slight mechanical ingenuity to return to the old style of metallic mirrors, and on a small scale I think they could be made quite as effective as the present form.

With regard to the effect of creolin as a germicide, I have not tested it scientifically, and do not know anything about it; that sort of question is one where the dental specialist should come in and investigate for himself. Some member of your Society should come down to my laboratory and settle that question. These are special things, the details of which I cannot make myself personally familiar with, and one of my objects in doing the work that I have done was to have a laboratory which should be thoroughly equipped, and should be open to any one who will take the proper training for doing this special work.

Electricity has not, so far as I know, been used in the disinfection of instruments. Its influence upon the vitality of bacteria in culture has been tried, and is unsettled, and certainly slight. Therefore, I should not suppose it would be of any service for the sterilization of instruments.

The sterilization of napkins can be very easily accomplished in this same Arnold sterilizer. All that you need is to have a wire basket in which they can be placed loosely and left in the sterilizer for fifteen or twenty minutes. Then they can be washed without any danger to anybody and used over and over again.

The question of perfect health and of lowered vitality is an important one in the production of pathological changes in the human organism, but the change of vitality which makes a person susceptible, as transferring him from a condition of insusceptibility, is so extremely delicate that nobody can tell when that change occurs. We know that a perfectly healthy person may be stricken down instantly by almost any form of disease, and all that we can say is that this element of lowered vitality has come into play, but exactly how or when we cannot say.

Referring to the practicability of this question, I have endeav-

ored to be as practical to you as I knew how. It was necessary to speak of the bases of the remarks and to explain them as well as possible. The practical part of it is distinctly what I am interested in as much as you are.

Dr. Reilly.—Before the subject is passed, I should like to ask Dr. Ernst if he can suggest anything for the use of the hands or nails which will render them sterile?

Dr. Ernst.—There is nothing that is absolutely certain to accomplish that except corrosive sublimate. To many skins that is like pouring kerosene on the kitchen-fire,—it will instantly start up an irritation that is anything but pleasant; but if the skin will stand it, a solution, one to five thousand, used with soap and brush, and followed by pure water, is very effectual. If one's hands cannot stand that, then the best we can do is to clean out the corners of the nails with a fresh orange-wood tooth-pick, and wash the hands as thoroughly as possible in water.

Dr. Bigelow.—Dr. Ernst made a remark that corrosive sublimate could be used effectively on instruments; I would like to know what strength is best.

Dr. Ernst.—One to one thousand, and it would be a little unsafe to use upon instruments that are going right into the mouth. I have seen injurious effect from absorption when instruments were used so quickly after being immersed.

Dr. Stanley.—I understood Dr. Ernst to say that a steam-bath was rather more effective than boiling in water. I cannot see why it should be.

Dr. Ernst.—It has been found by experiment that the actual temperature of a water-bath varies from the bottom to the top of a vessel, and you might get thorough disinfection at the bottom next to the flame, and not at the top. In the steam sterilizer the steam comes up and around the instruments, and the temperature is kept up by the constantly-renewed stream of live steam, and this being kept under a slight pressure, the temperature is always the same.

Dr. Taft.—It is said that soap and water is not an effectual way of getting rid of the bacteria, and yet it seems to me that we can convey micro-organisms from one mouth to another by our hands as easily as in any other way. Now, if the hands are not subjected to a steam-bath, how are we sure that we get rid of every bacterium? For, as I understand it, one can work as much injury as a thousand. To be sure, we wash our hands and cleanse the finger-nails after every operation before going to another patient, but we do not subject them to a steam-bath nor immerse in germicidal solu-

tions. How, then, do we know when we have gotten rid of all the germs, and when the hands and nails are surgically clean?

Dr. Ernst.—In the first place, the cleansing of the finger nails should be done before the final washing of the hands, and the washing of the hands should be done under tap, so as to carry off everything possible. In the second place, one cannot say that you actually do get rid of all the bacteria, but that you are doing the best you can for the protection of yourselves and your patients.

Dr. Taft.—In view of that, how much real danger is there in this whole subject of inoculation?

Dr. Ernst.—That is difficult to say. That disease is produced by these organisms is unquestionably true. Personally, I believe that the slightest lesion of the skin may be all that is necessary for the entrance of the bacilli. I was convinced of this by an experiment where I inoculated myself accidentally in my own laboratory. In a short time I had an abscess larger than my hand, from which I made cultures and carried out a scientific experiment. Several medical gentlemen were acquainted with the case and saw the result. The danger may not be very great; that it does occur there is not the slightest question. Some time ago I discovered that a patient of mine, who was afflicted with syphilis and had syphilitic patches in the mucous membrane of the mouth, had gone to a dentist whom I knew did not take the best precautions with his instruments, and I kept the gentleman away from that dentist. I should use my influence with my patients to keep them from a dentist whom I knew neglected the care of his instruments, and would not consider that I was violating the rules of professional courtesy by so doing, but simply protecting my patients.

Dr. Taft.—Do I understand, then, that unless there is an abraded surface there is no danger of inoculation?

Dr. Ernst.—That is an extremely difficult question to answer. The probabilities are that there is none. At the same time, even if that be true, we could not tell without the aid of the microscope that the entire surface of the mucous membrane is whole. There may be an abrasion sufficient for the entrance of the bacteria, which you saw on the screen, which could not be perceived by a mere inspection, so that even if a lesion be necessary, we cannot say that it is or is not present.

Dr. Giblin.—I would like to ask Dr. Ernst if there is a bacillus or bacterium which will cause tonsillitis? A relative of mine was afflicted with it, and while she was ill her little girl was taken down with acute tonsillitis. I thought possibly, by the use of a spoon or

some table utensil, which would not be sterilized by the usual method of cleaning, it might have been transmitted.

Dr. Ernst.—You were undoubtedly correct in your conclusions. Tonsillitis is unquestionably due to bacterial action; but, like a number of other diseases, it is not a specific disease,—that is, not all the cases of tonsillitis are produced by the same organism.

HENRY L. UPHAM, D.M.D.,
Editor Harvard Odontological Society.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE regular monthly meeting of this Society was held April 4, 1891. In the absence of the essayist for the evening, various practical suggestions were offered and considered by the members present.

Dr. Bassett.—It may be remembered that a few months ago Dr. Bonwill had a cast presented of a case in which the temporary superior lateral was missing. It was interesting as being very rare. I saw a case the other day, and have a model of it, in which both superior laterals failed to erupt. I have brought the model here. It was a novelty to me, but I do not know how much it may be to the other gentlemen; I had never seen a case before, and thought it might be interesting to show it.

The case is that of a little girl about eight years of age. As shown, the sixth-year molars are erupted, but the other temporary teeth are not loosened.

By way of asking for information, I would like to know whether any of the gentlemen have had similar presentations, and whether such are common or not. We frequently see cases where one or both of the superior laterals of the permanent set are missing, but I never before saw one where they were missing in the temporary set.

Dr. Truman.—I have seen cases exactly like it. It is rarely we have irregularity in the deciduous teeth. I presume the teeth are developed properly in the jaw.

Dr. Deane.—You think those deciduous teeth would be forced out later on in life?

Dr. Truman.—I should think so, when the permanent series come.

Dr. Rehfuess.—A short time ago I saw a case where two inferior

centrals were united. The peculiarity about it was that they were exactly similar. They could not have been put together closer than they were. They were exactly mates. It was not my case, but that of Dr. Robinson. They looked like ivory. It was a beautiful specimen of temporary teeth. I do not suppose that it was exactly a novelty, but the position of the teeth being so regular made it a particularly interesting specimen.

Dr. Truman.—I suppose Dr. Reh fuss means the union of the teeth. I think most of the members here have seen cases of that kind; at least I have, quite a number of them,—deciduous teeth united in that way and also permanent teeth. I do not regard that as a very extraordinary thing, although it is not common. A great many persons may go through many years of practice and see nothing of the kind. Clinical work in colleges will show more than private practice.

Dr. Bonwill.—All I have to say in regard to this is merely to give my experience with two cases I have had after thirty-six years in practice; they both came in the same year. One where both laterals were absent, and one case where the right superior lateral was missing, and in the other the left superior lateral was not in place. I am watching this case with a great deal of interest. I suppose there will never be any permanent laterals in their place. It is rather singular that I should never meet with anything of that kind in thirty-six years, and both came about the same time,—the same week.

Dr. Guilford.—How old is this child?

Answer.—About eight years.

Dr. Long exhibited an artificial tooth with a metal pin. I think it is a great improvement on any of the others. On account of having a screw cut in the body of the tooth, you can file your post any shape you want to suit, and then take out your post and grind the tooth to fit the root; and you are not troubled with the post in the way; then put a little cement on the post and screw it in the tooth, and after the cement hardens you can place the tooth in position.

Question.—Is this the old-fashioned pivot-tooth?

Answer.—There is a screw cut in the tooth that the pin fits in. I think the advantage is in taking out the post and grinding the tooth to fit. They are made by Johnson & Lund. The thread is made when the tooth is moulded and biscuited, and then it is baked. When it is in the mould, the pin is screwed out, I suppose. It could not be baked in the mould.

Dr. Rehfuß.—That is the way it is done. I saw the specifications of the patent. They biscuit it and then bake it afterwards.

Dr. Long.—I present for examination some very fine thin steel for matrices. It comes from Johnson & Lund. They will sell any quantity, large or small. Ordinary shears will cut it.

Dr. Guilford spoke of shears gotten up by the S. S. White Company for cutting hard substances, and recommended them to the members present.

Dr. Long.—I use a pair of shears which I bought in a ten-cent store for cutting emery-cloth. The action is as satisfactory as a high-priced pair, and I would recommend them to any one who does not wish to spoil a good pair in such work.

Dr. Guilford.—I did not think of saying anything to-night until I was on my way here, and then it occurred to me that there was one subject that has concerned all of us for a long while, and yet one in which many of us have not been sufficiently interested. It is the erosion of the teeth. I do not mean the erosion that we generally call by that name, where the surfaces are polished and smooth. I mean that resulting from any cause whatever. You know from your own observation the bad effect of certain medicines upon the teeth. To avoid this, physicians have been in the habit of telling their patients to take certain medicines through a tube, but a person cannot put a tube in the mouth and pour liquids down the throat, as we would into a barrel through a funnel. The liquids have to be taken into the mouth, carried to the back part, then thrown forward against the teeth and again backward, before they can enter the stomach. The physicians have been blamed for doing a great deal of damage to the teeth by the administration of certain medicaments, but we cannot place all of the responsibility upon them. We find cases of erosion where the cause is so obscure that we cannot definitely trace it. We sometimes attribute it to the taking of phosphates, or of vegetable acids in the form of fruit, or to the action of acids formed in the oral cavity, assisted, perhaps, by the low order of vitality of the teeth at the time. For my own part, I have felt for a long while that the phosphates that are so freely used to-day are responsible for much injury to the teeth. I had a case not very long ago which seemed to confirm this theory very markedly. A friend of mine, who is a druggist in one of the suburbs of the city, has a small business and sells soda-water. I have had the care of his teeth for many years. His teeth are of good average quality, and so are the teeth of all his family. His health has been good all along; no change in his system that I know of. I saw his teeth two years

ago, and they were then in fair condition. I saw him a few months ago, and I was very much shocked at their appearance. Two crowns were entirely destroyed, while others were badly eroded. On the approximal surfaces most of those in the anterior part of the mouth were entirely denuded of enamel, while on their labial surfaces the enamel was entirely gone from the upper half. I questioned him as to what he had been doing. I asked him if he had ever used phosphates. He told me that last summer he had used them almost exclusively for his beverage. He took what is called phosphate-soda. He had drunk a great deal of it. There is nothing else in his case that I could attribute that particular erosion to. I had another case showing the effect of other acids on the teeth of a lady who has been a patient of mine for a great many years. She came to me last spring, and her teeth were in good condition. Recently she called, saying that her superior anterior teeth were very tender at times. I looked them all over carefully, but there was not a cavity; the teeth seemed to have a natural appearance in every way. I finally took a napkin and wiped off the labial surfaces of the incisors. I noticed that when they were dry they had a crystallized appearance. Wherever the napkin touched the teeth they were exceedingly painful, while the touch of an instrument caused still greater suffering. There was so little wasting of the enamel that when the teeth were wet it did not show at all, as they retained their general form. I inquired into her case very closely, and finally ascertained that she had lived almost entirely on grapes during the past summer. We have seen the deleterious effect upon the teeth of grapes eaten in great quantities, especially in patients who have taken the grape-cure in Europe. Dr. Dixon mentioned to me the case of a young lady whom he had seen in the spring. She went to Europe, took the grape-cure, and came back in the fall with her teeth entirely honey-combed. In the case of my patient, I could attribute the harm done to no other cause but the acid of the grapes. I gave her proper directions, told her not to eat any more grapes, and prescribed the free use of prepared chalk around the necks of the teeth, especially before retiring.

The other case I had came to me a few days ago. It was that of a minister in this city, who is not only a close student, but has been very hard at work recently building a church. He is abstemious, does not smoke, and lives a regular and even life. His teeth were being eroded very much, as the druggist's had been. I inquired into his case, and could find nothing except that for a couple of years past he had been eating shaddocks for breakfast every morning.

We know the acid taste of this fruit, especially in the early spring. They are picked in a green state, and allowed to ripen on the way. I could attribute his difficulty to no other cause than that of eating this fruit. It seems to me that in all these cases the trouble was traceable to acids in some form.

There was another thing that attracted my attention. The erosion was confined to the right side. The centrals, laterals, and cuspids were particularly affected; the left were not so much, and it puzzled me to know why. It was not, of course, from any action of the brush, because he is a right-handed man, and it would show more on the left side if caused by mechanical action. I questioned him, and he said that for the last six months or more he had been eating upon the right side of his mouth, using the spoon in his right hand, and it probably came more in contact with the teeth on the right side than on the left. That seemed to me to be the reason why they were affected more on one side than on the other.

We have all been interested in this matter, and it seems to me that in all cases of this character we ought to try to get down to the facts, and find out, as nearly as we can, what has caused the harm, and some day we may be able to arrive at a reasonable conclusion in regard to it.

I should have mentioned another fact, and that is, so far as I know, we have never noticed any ill effects from eating grapes, except where the seeds are taken out. People who swallow the entire grape, without breaking the capsule in which the seeds are contained, suffer no injury to the teeth, but when the capsule is broken, the acid is liberated, and it is this that I believe to be the agent of harm in the matter.

Dr. Deane.—I would like to ask what the treatment would be in cases where the erosion is so marked.

Dr. Guilford.—I should try to get rid of the sensitiveness, and would forbid them using the article of diet suspected of being the cause. I said to the minister, continue your diet just as it has been, but stop eating shaddocks, and let me know in a month or so whether there is any improvement. In the second place, I recommend something to counteract the acid, generally precipitated chalk applied just before retiring.

I would like to ask if Dr. Truman noticed any effect of mineral waters upon the teeth when abroad.

Dr. Truman.—Not particularly. In regard to mineral waters, there is a great difference. Some are more or less acid; others are neutral; others are alkaline. I made some experiments in regard

to that matter, and the rapidity with which the neutral mineral waters changed to acid, producing rapid development of micro-organisms out of the mouth, would indicate the probable effect on the teeth.

Dr. Woodward.—I have a very marked case of erosion, which I have observed for several years. The enamel and dentine appear to melt away from the gutta-percha, as well as from the amalgam and gold. The patient is in the habit of using acids for long periods to control the action of his liver, and maintains that this cannot be avoided. His teeth are almost destroyed. I think the erosion is caused by the acid, the dentifrice, and the brush. The acid condition softens the surface of the teeth slightly, which yields readily to the brush and polishing material. In ordinary cases the precipitated chalk will relieve the sensitiveness, especially if used liberally at night.

Dr. Deane.—Dr. Woodward brings my own case in mind. I am troubled with slow, sluggish action of the liver. I have to take a great deal of muriatic acid, and take it very strong. I take sometimes as high as twenty or twenty-five drops. I have not, as yet, felt any discomfort of the teeth, but I would like very well to find some substitute for the acid, as I am becoming uneasy as to the possible effect.

Dr. Guilford.—In Dr. Deane's case, I would say that the general condition of the system has something to do with the effect of acids upon the teeth. I have no doubt that many of us take as much acid as the minister did. He was in a run-down condition at the time; so much so, that it acted as a predisposition in his case. The lady I spoke of was also in a debilitated condition. I suppose that many of us are at times subjected to similar influences, but, owing to other conditions, we are not affected in the same manner. I do not think their teeth were especially affected because they had used more acids than others, but because of the then low condition of their systems. I have not paid any attention to temperament, only to the fact that they were overworked or overtaxed.

Dr. Truman.—I cannot quite agree with Dr. Guilford in the idea that temporary systemic conditions make the teeth more liable to destruction. I cannot see why that should be the case. The teeth remain unchanged, no matter what the general conditions of the organism may be. Therefore, whatever takes place must necessarily be external to the teeth, and not through any special and temporary loss of vitality.

In regard to the general subject of erosion, there is probably

much yet to be learned. I have given my views frequently in the dental periodicals, and very recently in the *INTERNATIONAL DENTAL JOURNAL*, in the report of the New Jersey State Society, in which I went over the ground thoroughly, so that I have very little to offer in regard to it; but Dr. Guilford has brought up some points that were not then discussed, and to my mind they are quite important. This whole acid question—fruit acid—has not been sufficiently considered, for the reason, it seems to me, that dentists do not take a proper view of it. This subject of erosion by fruit acid has always been a matter of very great interest to me. I presume every one here will bear out the assertion I am about to make, that patients are more troublesome in the spring of the year, at the time we have our strawberry crop, than at any other period. I find that the acid of the strawberry known as the Wilson Seedling is very acid, and it brings about almost invariably a troublesome condition of the teeth, the sensitiveness being greatly increased.

The acid of lemons and fruits of similar character, I am inclined to think, is more destructive to teeth than any that our patients are in the habit of using. It is a very common thing for some persons to puncture lemons and take the juice directly into the mouth. Some persons like it, but I cannot witness it without a shudder.

The acid of lemons will destroy teeth in a very few weeks. I had an excellent illustration of that fact. In crossing the ocean, a member of my family, against my advice, made use of lemons to overcome sea-sickness. The teeth were all right when we left home, and in three weeks' time they exhibited marked signs of erosion on the surfaces of the anterior teeth. I have noticed this occurring constantly in the use of fruits of this character.

With regard to acid remedies much in use, I agree with Dr. Guilford. These phosphates are destroying teeth by the hundred. There is no question about it. The sooner the dental profession protests, the better. I think it is our duty to warn our patients.

I had a patient, a few years ago, that caused me the greatest possible trouble. She was suffering constantly with toothache. I examined the mouth over and over again. I gave her antacid washes, but the relief was only temporary. I could not discover the cause. I said to her, finally, "You are habitually in the use of some agent that is antagonizing my efforts." She did not know that she was. I finally pushed my inquiries to the tooth-powder she was using. Her answer was that she employed a powder recommended by a physician. She brought me some of it, and I went over the ingredients. I said, "Do you use tartaric acid in that

powder?" "Oh, yes," she replied; "I was advised to use a little of it." The cause being discovered, the remedy was simple; the teeth yielded to treatment at once, and the cavities were filled properly.

Then there is the action of different mineral acids. I am surprised that our friend here, Dr. Deane, will use these in the way he does, and, though he may not feel any trouble now, he is bound to have it before long. Several years ago I had a patient employed in a confectionery establishment. Of course the confectioner's sweet always means an acid resulting. The destruction was almost universal and the sensitiveness beyond endurance. Before operating at all, I placed her under the effect of a daily wash of a solution of bicarbonate of soda; the result was very gratifying, and at the end of a week I was able to operate with comfort to her and myself.

I had another patient who was a worker in a chemical laboratory. She had beautiful teeth,—one of the most beautiful sets I think I ever saw for regularity and for density, which is to the dentist much more satisfactory than white teeth. She was not in the acid department, but still was so constantly affected by the atmosphere that it was impossible to save her teeth for any length of time. I finally advised her that, unless she could change her business, it would be impossible to save them.

On the whole, the matter of erosion I regard as altogether a chemical one; and to me it is immaterial whether it be the anterior or labial surfaces of the teeth that are worn away. It is unquestionably always due to the acid condition, and I do not, as I have stated in other papers and discussions, separate abrasion from erosion. Abrasion may be by simple attrition of one tooth upon another, and that attrition always advances, in my opinion, by an acid condition.

I had a very fine illustration of this some years ago. A prominent clergyman desired a tooth regulated. He had a beautiful set of teeth. The incisors were magnificent specimens. I placed on the regulating apparatus, and he did not appear for some time, to my annoyance. In about a month he returned with the central incisor worn down a quarter of an inch from the cutting surface. I asked him what he had been doing to cause this disturbance. He replied, nothing. But I answered, "This single incisor could not have lost so much of its grinding surface without some irregular action." He then told me that the teeth annoyed him, and he had been biting the lower teeth against the central incisors. The abrasion was evident; but all the biting possible could not have worn it down to that extent in the course of four weeks without the aid of acid secretions. It was evident that the change produced at night from

the neutral day secretion had worn down the tooth by the acid produced, and attrition had done the balance.

You know how rapidly the teeth of those who grind the teeth at night disappear on the cutting edge; how soon they are reduced to almost stumps. It is not the grinding solely, in my judgment, but a combination of acid and wear. I have always secured an acid reaction in mouths tested at night, though neutral in the daytime. If this be the case, we can understand erosion. As I said at the New Jersey State Society, I do not regard this action of erosion as a difficult problem; it is one of simple things; and if we look at it in the right light, always taking the acid view of the question from the beginning, it will lead us up to clear conclusions in regard to results.

Dr. Tees.—I find in my own practice among my regular patients who obey my instructions in the use of prepared chalk once or twice daily that they have no evil results from the use of acids. They may use fruit of any kind, lemons or anything else. In fact, in some cases I recommend the application of lemon juice around the gum. The most efficient antacid that I know of is prepared chalk.

I think the cases described by Dr. Guilford are exceptions. I do not suppose he meets on the average more than two or three a year, and I have no doubt such are in the mouths of those who never use the tooth-brush. I furnish prepared chalk to patients in half-pound packages, that they may have plenty of it. I have no doubt the use of it is a great benefit. No doubt we have all noticed how quickly the mouth responds to treatment when this is ordered. After the use of such preparations, the painful effect ceases, and we are able to operate with some degree of comfort.

Dr. Chupein.—I should like to ask Dr. Truman how he accounts for the highly polished condition of the erosion, if, as he says, it is due to chemical action.

Dr. Truman.—I will ask the gentleman to go back many years with me. Possibly he remembers the old clamps or clasps of some thirty years ago that used to be attached to the teeth. They were made of half-round wire, and to these were attached perhaps two or three teeth, and the invariable result of that was the wearing away of the teeth they were attached to, precisely as we see the erosion at the present time, and highly polished. I presume he will agree with me when I say that I have seen them cut half-way through the teeth. The irritation which was aroused by that half-round wire produced secondary depositions in the pulp, and the

result was that the wire would go through the tooth without producing pain. Now, how was that effected? How was the polish produced? It was by the constant movement of the clasp and the movement of the secretions. You cannot get a polish by merely chemical action. You do not find any polish in teeth of a soft character where the acid acts with great rapidity. It is only in dense teeth. Secondly, this erosion occurs at middle life, when the teeth have nearly reached the maximum of density. This is my experience.

How do I account for the polish on the front teeth? There is a constant motion there of the muscles of the lip. In talking, of course, there is always motion of the teeth and lips. Then there is a constant flowing in and out of the secretions and the food constantly pressing on these surfaces. The tooth-brush may be a factor also, but it seems to me not a powerful one.

I hold that the polish is simply produced in that way, and I see no reason for any other explanation. I know it is a difficult thing to test, and we are obliged to reason from analogy, hence I brought up the clasp as an illustration, because I know Dr. Chupein and others here as old as myself remember the condition of things as a result of its use.

Dr. Tees.—Dr. Truman stated that cases of erosion were nearly always at middle life. I have seen a great many in the twenties. Erosion where a great deal of the tooth substance is worn away. The polish was there also.

Dr. Truman.—You may have dense teeth at twenty years of age. It is always confined to dense teeth.

Dr. Chupein.—I have never noticed the conditions except in middle life in very dense teeth.

Dr. Tees.—I had a patient to-day with two very distinct small cavities on the labial surfaces of the superior right canine and superior right lateral, a sixteenth of an inch deep, and probably the width of a small pin-head. I would like Dr. Truman to give his opinion of these two cavities. They were on the labial surfaces of the superior right canine and superior right lateral, two distinct deep cavities. The rest of the enamel was perfect. Now, what could have caused this?

Dr. Truman.—These were ordinary cavities?

Dr. Tees.—Yes; but why should those little, distinct cavities be there? Why should not the whole surface there have decayed? It has been within a year that the cavities have formed.

Dr. Truman.—The only explanation is that they always begin

at a small point. There is one portion of the tooth which comes nearer the lip than any other point, and, as Dr. Kirk has demonstrated the glands of the lip to be always acid, it will then be understood why it would begin at a particular part on that surface.

Dr. Tees.—Dr. Flagg has done what Dr. Truman gives Dr. Kirk credit for.

Dr. Truman.—I must take exception to that. No one, as far as I am aware, has demonstrated facts as Dr. Kirk presented them. We know very well, in a general way, that the mucous glands are considered to exude an acid secretion; but you cannot always get an acid reaction from other portions of the mouth. Dr. Kirk was induced to make these experiments by the facts which I gave in regard to the secretions at night being powerful and more destructive at that time than during the day or active period. I took the position that the upper lip held the secretions against the teeth, and fermentation took place. Now, Dr. Kirk's demonstration was to prove that they were acid during the whole twenty-four hours, and he went into a series of very delicate examinations to demonstrate that fact. I do not know that it ever was done before. I therefore give him the credit.

Dr. Tees.—Dr. Flagg said that the mucous secretions of the mouth were acid. If the whole mucous secretions of the mouth are acid, of course the lips ought to be also; and he also explained that in a healthy condition of the mouth the secretions of the salivary glands were alkaline, and that the secretions of the mucous membranes, being acid, neutralized each other.

Dr. Guilford.—In regard to the matter of erosion, I have seen many varieties of it; the most common one, of course, being that of the disappearance of the enamel. I have seen it between the teeth and not upon the labial surfaces. I have also seen it in a sort of worm-shape distribution around the incisors and palatine surfaces; but the most singular case was that of a young lady, twenty-five or thirty years of age, whom I was called in to see. The fillings, which had been put in a few years before, were all perfect, but the whole surfaces of the enamel had dissolved, just as though the teeth had been made of candy and had been dipped in water several times. All of the fillings stood slightly above the surrounding tooth tissue. It was the only case of the kind that I have ever seen.

Subject passed.

Dr. Deane.—I have the subject here of statistics of manufacturers. I would like to ask for some instructions. It seems the agent is canvassing the matter in a new way. It seems to me the

statistics would be of benefit to dentists. The agent has called on me and explained it so that it seems not to lessen professional dignity to fill out these blanks. I would like to know whether the Society objects to a member making the desired record. I have been asked this question by several members.

Dr. Guilford.—I think the agents have been asking too much. Certainly what they did ask for seemed to be obnoxious to those who were approached.

Dr. Deane.—This agent simply requires the number of plates that you have made for the year 1889, not bridge- or crown-work, or anything of that kind, as to the quantity of plates and how much they were worth, not individually but collectively. If you do not manufacture plates they do not want to know anything about it.

Dr. Guilford.—The Baltimore dentists were up in arms about it. They considered it inquisitorial. They would not give the facts wanted.

Dr. Tees.—I move that the resolution on the books be reconsidered.

Dr. Rehfuß.—I should be thoroughly opposed to rescinding this resolution. First, because this Society and the dentists of Baltimore have taken a stand in showing their position to the dental profession. The government has made a mistake in issuing this form,—that they acknowledge,—and this blank is a modification of the blank presented before. It has not the slightest thing in it in regard to the separation of mechanical from operative dentists. I do not think the plan would give correct statistics. I think the Society should allow the resolution to stand.

Dr. Deane.—I cannot quite agree with Dr. Rehfuß. I think he overlooked the point that, if it is possible to find out how many plates are made once in ten years, it would be of great value to the dentists, and that is all they ask for. They do not require you to say anything about your fillings, nor anything about the number of operations, but merely the number of plates manufactured; and they want to know, once in a stated period, how many plates are manufactured in the United States, and how much money was put into it. It seems to me that in thirty or forty years from now the statistics will be of great value to dentists.

Dr. Truman.—I think this Society or some other Society ought to take action to get the tariff taken off English teeth. It is impossible to get English teeth now without a great deal of trouble. The tariff was raised from 20 to 55 per cent. ad valorem.

Dr. Guilford.—I think I saw a statement of some one in the West who said that there was a mistake, and that they ought to have been rated under the name of manufactured articles, and not porcelain.

Dr. Truman.—I sent to Washington to our representative to get the facts, and he sent me a work covering everything. It gives a list of the old terms, and then says, "Refer to porcelain." Referring to porcelain, it has nothing to say with regard to teeth, but states that all porcelain not ornamented shall be at the rate of 55 per cent. ad valorem. If an attempt be made to import teeth, it will be found that the duty will be 55 per cent., and that is practically prohibitory.

Editorial.

THE DENTAL PROTECTIVE ASSOCIATION.

It may seem to some an anomaly that dentistry should need protection more than any other kindred profession, or that it should require an association with large capital to protect it from the encroachments of monopolies working under the authority of the seal of the United States.

The experience of the dental profession in this part of the world in the operation of patent-laws has not been a pleasant one. Indeed, the history of the past, familiar to all, is replete with injury to individuals, and, in the broader sense, has been a continued hinderance to true progress.

Patent laws have, unquestionably, been a great incentive to improvement, but they have equally stimulated the grasping spirit of capital. They have quickened the inspiration for development, and have, by the power conferred, destroyed many original and valuable improvements, that others might have no competition in the marts of trade. This crushing-out process is not peculiar to any one line of business, but seems to be a necessary outgrowth of the laws adopted for the protection of the inventor, and has assumed proportions in direct ratio to the value of certain products.

The Dental Protective Association, which in one aspect seems unprofessional, has been the growth of necessity, and its development is one of the marvels of the past decade. We believe it to be peculiar to dentistry, as we know of no other similar organization

so thoroughly arranged or so completely under control as this has been demonstrated to be. When it is considered that this work has been mainly accomplished through the indomitable energy of one man, Dr. J. N. Crouse, of Chicago, the surprise is increased.

Revolutions develop men and measures, "new occasions teach new duties," and it has been left for our profession, untrammelled with precedents, to mark a path for others to follow.

The Association is not in opposition to law, but in harmony with it. It is organized to test the rights of individuals, and when the last court has been reached, and the decision given, it closes further contest in any given case. It simply proposes to perform a duty not possible for individuals, and says to the combinations, in emphatic language, "Your claims are not recognized until the final record has been made, and it is your duty to make these good, as it is ours to contest them."

The results thus far obtained have been most satisfactory, as the reports of the organization have amply demonstrated; and while the legal work will be continued, the future seems to promise an enlarged sphere of action possibly not contemplated by its originators.

The dental profession, like all other bodies of a similar character, is to-day widely scattered over this continent. While it numbers fifteen thousand, and constantly increasing, the membership in the organization does not, as yet, comprise a proper proportion of this large body. Every individual should have his name on the books,—not solely for self-protection, but that he may come directly in touch with his fellow-practitioners throughout this broad domain. There is something inspiriting in the feeling of being one with a large, active profession, and, however isolated the individual may be, the pulsations of the great body will be felt, and just in that proportion will each one be strengthened and elevated.

This is the broad view of the work, and it is by no means the least. The possibilities of an organization such as this are not easily to be realized at the present. We regard it as one of the active agents in elevating dentistry, binding the individual members together as one man in the progressive strides towards professional unity.

The legal aspects are now the most important. They naturally appeal to the self-interest side of every practitioner; but while they do this, let the higher thought be not forgotten,—that the ultimate tendency of this organization is to lead to a union of effort in all that is uplifting and to that which marks a broader conception of duty.

THE "DENTAL ADVERTISER" AND ITS NEW EDITOR.

THIS quarterly journal announces a change in the editorial department, Thomas G. Lewis retiring, after a service of twenty-two years, and W. C. Barrett, M.D., D.D.S., taking his place.

The present number gives marked indications of his energetic work, and the editorials fairly bristle with his vigorous English. We congratulate this journal in securing the services of one who says exactly what he thinks, and means to be understood beyond any possibilities of doubt. Such men are rare, but are all the more valuable on this account.

It is a sign of the change coming, that the so-called trade journals are beginning to understand the fact that dentists are growing too intelligent to appreciate the cheap material ordinarily dealt to them under the name of dental literature. A high standard is demanded, and it is satisfactory to observe that the necessity for a change is being comprehended.

BIBLIOGRAPHY.

CHEMISTRY OF THE CARBON COMPOUNDS. OR ORGANIC CHEMISTRY.

By Professor Victor von Richter, University of Breslau. Translated by Edgar F. Smith, Professor of Chemistry, University of Pennsylvania. Philadelphia: P. Blakiston, Son & Co., 1891.

The appearance of a second edition of this most excellent work so soon after the appearance of the first edition is a sure indication of the esteem in which this book is held by chemists and students. The second edition, which is a translation from advanced sheets of the sixth German edition furnished by the courtesy of Professor von Richter himself, is a volume of 1040 pages, an increase of about 300 pages over the first edition, and is a most complete compendium of organic chemistry brought up to the very latest date.

All of the approved methods of elementary organic analysis are described in detail, together with the methods of determining molecular formulas, including the recent methods of Van't Hoff and of Raoult.

The most modern views relating to the theory of the structure of organic compounds, including the stereo-chemical and tautomeric theories, are admirably explained.

The special part descriptive of the properties of organic compounds is complete and brought up to the present time.

The English-reading chemical world certainly owes a debt of

gratitude to Professor Smith for rendering available this most excellent work, which serves not only as one of the best text-books and a complete work of reference, but also to a great extent as a guide in prosecuting work in organic chemistry in the laboratory.

M.

BOOKS RECEIVED.

The following books have been received. Notices will appear as rapidly as possible :

"Annual of the Universal Medical Sciences." Edited by Charles E. Sajous, M.D. In five volumes. F. A. Davis, publisher, Philadelphia.

"A Short Manual of Analytical Chemistry." By John Muter, M.A., Ph.D., etc. First American from the fourth English edition. P. Blakiston, Son & Co., Philadelphia, 1891.

"The Pocket Materia Medica and Therapeutics." By C. Henri Leonard, A.M., M.D. Illustrated Medical Journal Co., Detroit, Mich., 1891.

"The Vest-Pocket Anatomist." (Founded upon Gray.) Fourteenth revised edition. Illustrated Medical Journal Co., Detroit.

Obituary.

C. A. KINGSBURY, M.D., D.D.S.

DR. KINGSBURY, of Philadelphia, died, after a short illness, October 3, 1891.

Dr. Kingsbury was born in East Windsor, Conn., in 1820. Being left an orphan at an early age, he removed to Northern New Hampshire, where he attended the local schools until he was sixteen, when he became a teacher, at the same time pursuing his studies at the Wesleyan Academy, Massachusetts, and Newbury, Vt. He began the study of dentistry at Trenton, N. J. He removed to Philadelphia in 1839, and entered actively in the practice of his profession.

His interest in everything that tended to advance dentistry in a truly scientific direction was deep and lasting, and when the Philadelphia Dental College was founded, in 1863, Dr. Kingsbury was elected to fill the chair of Dental Histology and Operative Dentistry. Having served in this capacity for some time, he resigned, and was elected Emeritus Professor in the same school.

Dr. Kingsbury had an extensive knowledge of men in many stations of life. His activity seemed to have no limit, and probably this hastened his death, as he worked continuously over the

chair during June of this year, being more pressed with practice than at any period of his life.

His many-sided character led him away from the narrow paths of recreation ordinarily trodden by professional men. He had an intense love of nature, and usually spent his summer vacation in remote places salmon-fishing and hunting. It was while on a trip West he was taken sick, and which proved to be the close of his life-work. His love of angling was only excelled by his prototype Isaak Walton, and his greatest pleasure was found in places and streams not frequented by the idle summer crowd. This taste led him to an intimate knowledge of the habits of the denizens of the air and water. He took great interest in the efforts to stock our rivers with fish, and was a member of the Pennsylvania Fish and Game Protective Association.

Interest in religious matters was a marked trait in his character, but he was broad enough not to confine this to his own persuasion.

He was pre-eminently a social man, and continued to the hour of his death a member of the Philadelphia Dental Club, where his extended information and varied experience added much to the intellectual enjoyment of those reunions.

In his professional work he stood in the front rank. Associated as he had been with the most prominent men in dentistry, contemporary with Townsend, Harris, Arthur, and other leaders, he had advanced with its growth, ever conservative, but still ready to adopt new methods when proved valuable.

He was a member of several dental societies, and was one of the original members of the Odontological Society of Pennsylvania, and continued active in its work to the close.

He took a positive interest in the "men before the mast," and was president of the Seamen's Aid Society.

To the writer and many others his death comes as a personal loss. The number of those who have been called from active professional life has been in recent months, as a writer expresses it, "truly appalling;" and it does certainly appear as though death had never before been so active in our ranks.

Dr. Kingsbury took part at the "Patriarchs' Dinner" in New York, and made an address upon that occasion. This reunion, so happily planned by Dr. Kingsley and others, was to him a satisfactory meeting, bringing him near those who had worked and labored for the elevation of his chosen calling.

The dental profession will join in the feeling that it has parted with an earnest and consistent worker, and an exemplar to those

younger men who must not only fill his place, but others daily becoming vacant in the profession.

He leaves a wife, one daughter, and two sons to mourn his loss.

The funeral services took place at the Methodist church, Broad and Arch Streets, Philadelphia. A large number of the dental fraternity were present. The interment was at Allentown, N. J.

DR. DAVID ROBERTS.

DR. DAVID ROBERTS died suddenly on September 30, 1891, having been actively engaged at his desk until eleven o'clock the previous evening.

Dr. Roberts was a native of Delaware, having been born in the old town of New Castle, November 17, 1822. His father, Joseph Roberts, filled the office of Prothonotary of the Court of Common Pleas of that county. The son was a self-made man, having received an ordinary English education in a school in New Castle. He left home at fifteen, and after pursuing various avocations commenced the study of dentistry with Dr. Gilliams, of Philadelphia. He began practice in 1849, on Spruce Street, near Fourth.

On the establishment of the Philadelphia College of Dental Surgery, in 1852, he entered as a student, and graduated in 1854. (This college must not be confounded with the present one bearing that name. The legitimate successor is the Pennsylvania College of Dental Surgery.)

The subject of this sketch was very successful as a practitioner, and by careful business habits and judicious investments early acquired a competency, and retired from practice in 1878.

His interest in his profession continued, being manifested in many ways. In a recent conversation with the writer, he expressed a fear lest he might be considered as one outside of dentistry, to which he had devoted his best years.

For a long period, and up to the close of his life, he acted as secretary of the board of trustees of the Pennsylvania College of Dental Surgery, and was otherwise actively engaged in furthering the interests of the college and dental education in general.

Dr. Roberts's genial character, together with his marked personality, will cause a vacancy in dental circles in Philadelphia, already heavily afflicted by the loss of a number of its prominent workers.

Dr. Roberts married Miss South, of Philadelphia, in 1858, who survives him. There are no children. Five brothers and a sister

are living,—viz., Rev. Edward Roberts, Alfred, James B., General Joseph Roberts, U.S.A., of Philadelphia, Henry Roberts, of Washington, and Miss Margaret Roberts, of Philadelphia.

Dr. Roberts's funeral took place at his residence, 214 West Logan Square, October 3; interment at Laurel Hill Cemetery.

Current News.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE Twenty-fourth Annual Meeting of the American Academy of Dental Science will be held in Boston on Wednesday, November 11, 1891, at 3 P.M.

The annual address will be delivered by George S. Allan, D.D.S., of New York.

E. N. HARRIS, D.D.S.,

Corresponding Secretary.

248 BOYLSTON STREET, BOSTON, MASS.

ANNIVERSARY MEETING OF THE FIRST DISTRICT DENTAL SOCIETY.

THE First District Dental Society of New York City will hold its usual anniversary meeting during the first week in January, 1892. The essayists are all eminent gentlemen, and the papers will be upon topics of vital interest. Specially-prepared discussions will be arranged, in which equally prominent men will participate.

It has been decided to manage the clinics upon a novel plan. Nothing will be offered that has ever been shown before. Gentlemen who can promise to exhibit some entirely new method, instrument, device, or medical agent are cordially invited to communicate immediately with Dr. F. A. Roy, 148 West Seventieth Street, chairman of Clinic Committee. Arrangements will be made so that every one shall have an opportunity to witness all demonstrations.

It is confidently predicted that we shall have with us, as usual, the majority of the prominent men of the country, and all are cordially invited to attend.

M. L. RHEIN,

GEORGE H. WINKLER,

RODRIGUES OTTOLENGUI, *Chairman,*

Executive Committee.

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Original Communications.¹

THE CHEMICAL METAMORPHOSIS OF THE FLUIDS OF THE MOUTH WITH RELATION TO DISCOLO- RATION OF GOLD.²

BY EDWARD S. NILES, D.M.D.

THE subject of chemical metamorphosis in the mouth is one that requires very long and deep scientific study. The particular phase that I want to present to-night is one perhaps of minor value in our profession, and yet, incidentally, it is of great importance.

Some time ago I was interested in the phosphates, and a suggestion presented itself to me while investigating the different compounds which I have always intended to follow out. Since that time various hints in the same line have come up which I have mentally pigeon-holed until the time when I should be able to confirm my impressions and present them to the profession.

The discoloration of gold in the mouth has never, to my mind, been satisfactorily explained, both with regard to that of fillings as well as plates, and I doubt if any one has really put his mind to work upon the subject to discover what really is the cause of the

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the Harvard Odontological Society, May 28, 1891.

trouble. As I call your attention this evening to certain facts, it will seem very plain at least that previous opinions are not at all well founded.

First, you know that the gold which we use for filling must be pure gold, containing no alloy whatever,—at least I am told by Dr. Watts, one of our oldest manufacturers of gold-filling materials, that the least alloy will destroy its cohesive quality. Dr. Watts smiled when I asked him what metals were used to alloy the gold used for filling, and said, “If you only knew that a slight trace of alloy would render it non-cohesive you would know that all gold used for fillings must be essentially pure.”

In the lectures at the school Dr. T. H. Chandler gives it as his opinion that in manipulating by mechanical contact with the iron from our instruments, or in burnishing, we rubbed off some portions of metal on to the gold. But if you stop to think of this idea a moment you will see how improbable it is. The gold is soft, while the instrument is steel of a high temper, purposely hardened in order to do the work for which it is used, and we know that gold adheres to the instrument instead of *vice versa*. I venture to say there is not a trace of steel transferred from the instrument to the gold.

Another theory of this discoloration was that which was brought forward by Dr. W. H. Rollins some time ago, that the gold was impure. All the reply that is to be made to that I have already made,—namely, it would be rendered non-cohesive if alloyed sufficiently to cause the amount of discoloration present.

These are all the explanations brought to my notice in regard to the discoloration of gold, of plates or fillings.

I have here a plate which perhaps furnishes a fair sample of the discoloration referred to. A significant fact is that the discoloration of a gold filling is a ruby color, and the discoloration of gold plates is identical with it. This will deepen and assume almost a black color as it accumulates, but it is really a ruby-colored film, contaminated with food, tartar, or tobacco-smoke; of course the color may vary. I will pass this plate around and you will notice the varying shades of color. When held in certain lights,—especially the sunlight,—it is a very deep ruby color; look at it again, and it disappears. The plate was polished by me a few months ago and is not very thickly coated. In different lights it presents varying shades of the same color. The question may be asked, If silver, gold, and copper be alloyed together, will their salts be the same as when produced from the separate metals?

Well, we know that a mechanical union exists between the silver, the gold, and the copper proven in this way. A gold plate alloyed with copper when boiled in nitric acid loses its copper and retains the gold. The union between the metals is therefore simply mechanical, so that the salts would not be changed,—that is, the salts formed will be essentially the salts of the metals possibly intermingled. This fact being settled, let us see what salts of these metals are of a ruby color. First, we will take silver. Are there any ruby salts of silver? It is an easy matter to refer to the standard works in chemistry and ascertain the color of the different salts, and thus make an analysis by exclusion. We find that the chlorides of silver are white, the oxides are brown or black, the sulphides and compounds of sulphides are black. There is a sulphide of silver which is red, but it is a mixture of arsenic and silver. As there is no arsenic or compounds of arsenic in the fluids of the mouth, or in the alloys of gold, this excludes silver.

Now let us examine copper: the sulphides of copper are blue, the chlorides are green, the oxides are blue or brown, the phosphides are black, so in going over the possible salts of these metals that may be formed by metamorphosis in the mouth, there are no salts that could be produced from either of these two metals that would give the ruby color which we find upon the gold of fillings or plates. We have then but one inference left, that it must be a salt of gold itself.

In this analysis by exclusion we have driven the investigation to the last and only metal; all metals that enter into this question are excluded except gold. The oxides of gold are derived from the chlorides,—the only way they can be produced. The chlorides are first produced, using nitro-hydrochloric acid; the oxides and chlorides are both yellow. The sulphides of silver, which form on a spoon when placed in an egg, cannot be produced either upon alloyed gold or pure gold when placed in the same medium for months. I have tried the experiment of placing pure gold and eighteen carat gold in decomposing egg for two months, and they were as bright at the end of that time as when first placed in the test. There remains one salt of gold for us to consider before I call your attention to what I believe to be the true solution of the question,—the purple of Cassius, but as we look at the manner of the formation of purple of Cassius we find that that must be excluded because tin is used with heat, and I do not know that there is any tin used in our gold plates; besides, there is not sufficient heat to develop the color if tin were present. There is no tin used in gold fillings.

We have then circumscribed the field of investigation to one salt of gold, and that is, the phosphate of gold. Some time ago I presented a paper to this society on the decomposition of phosphates in the mouth, the result of some experiments performed in the chemical laboratory of the Harvard Medical School with Professor Hills. These experiments were made to prove the decomposition of the phosphates of the tooth developing free phosphoric acid, and proved the presence of free phosphoric acid in dental caries. These phosphate salts of lime, etc., are not only in the cavities of decay, but around the necks of the teeth and in the fluids of the mouth, a fact well known. The manner of formation or decomposition can alone be a matter of any doubt. In Bloxam, page 261, after speaking upon phosphorus, its action not only upon gold, but upon platinum, this experiment is given, which proves that the combination of gold and phosphorus will produce the discoloration referred to. "By floating very minute scales of ordinary phosphorus upon a dilute solution of chloride of gold, the metal will be reduced in the form of an extremely thin film, which may be raised upon a glass plate, and will be found to have various shades of green and violet by transmitted light, dependent upon its thickness, while its thickest part exhibits the ordinary color of the metal to reflected light. By heating the films on the plate, various shades of amethyst and ruby are developed. If a very dilute solution of the chloride of gold in distilled water be placed in a perfectly clean bottle, and a few drops of ether in which phosphorus has been dissolved, poured into it, a beautiful ruby-colored liquid is obtained, the color of which is due to metallic gold in an extremely finely-divided state, and on allowing it to stand for some months the metal subsides as a purple powder, leaving the liquid colorless. If any saline impurity be present in the gold solution, the color of the reduced gold will be amethyst or blue. These experiments (Faraday) illustrate very strikingly the use of gold for imparting ruby and purple tints to glass and the glaze of porcelain."

There is also another reference in Bloxam, page 434, on this same subject: "If very finely-divided gold be suspended in water, it imparts a violet or red color to it. Such colored fluids, containing very minute particles of gold in a state of suspension, may be obtained by the action of phosphorus dissolved in ether upon a very weak solution of gold in aqua regia."

Although this does not prove conclusively that this color is due to phosphorus, yet there is this point that may be made: That a combination of finely-divided gold and phosphorus produces this

color, which is present both upon the pure gold of fillings and upon gold plates. Some days ago one of the physicians of this city was in my office, and I was speaking to him upon this matter, and said that, according to my observations, the discoloration of gold in the mouth was most persistently present in cases of patients of nervous prostration or nervous disorders. I have several patients in mind whose fillings have been tarnished, and the majority of them are subject to some nervous trouble. One of the patients wears a plate which has to be polished every few weeks. We know that the chemical properties of nerve-matter are mainly phosphate of lime or phosphate of magnesia, and a nervous disease would naturally excite the elimination of these substances from the nerve-tissues in various forms. I am not prepared to give the exact reaction which brings about the phosphorus and gold combination spoken of, but the presence of both elements in the mouth, coupled with the coloring referred to, renders the theory advanced a very probable fact.

If these observations are worth anything they prove this: That in regard to the discoloration of gold in the mouth it makes very little difference what carat of gold we use for plates, a high carat is quite as likely to discolor as a low carat,—we may use a fourteen carat or a twelve carat without fear of greater discoloration, and this is consistent with my experience in practice.

The plate passed around at the meeting of which this paper was read was thoroughly cleansed from all foreign matter and subjected to the action of strong nitric acid for three weeks. A part of this acid was tested in the usual way with molybdate of ammonia, for phosphates or phosphorus and a strong reaction gave the confirmation of its presence. The other portion on testing gave traces of gold sufficient to confirm its presence. The solubility of gold of the ruby salt in strong nitric acid is of course a matter of doubt.

HOW SHALL WE PRACTISE DENTISTRY IN ORDER TO MAKE IT HEALTHFUL?¹

BY DR. CHARLES T. TERRY, MILAN, ITALY.

How often we hear it said that our calling is not a healthful one, and how often we think so ourselves; but, is it really the fault of our occupation?

¹ Read before the American Dental Society of Europe, at Heidelberg, August 4, 1891.

This is a question which interests us all. The influence of strong muscles, steady nerves, a delicate touch, and a level head on the salvation of teeth speak for themselves, and that these are merciful possessions in a dentist every patient whom we treat will testify, from the comfort and confidence which they give.

My experience of thirty-two years in our profession has convinced me that of all the different materials which have been used for filling teeth, gold, and gold combined with other materials, in the hands of careful, skilful dentists with good judgment, stands far in advance of everything else.

What material is there at the present day which enables the enterprising, skilful, conscientious dentist to accomplish what he knows to be his duty to his patients that can take the place of this material?

With gold, generally speaking, you are master of the situation in strengthening frail walls, enclosing exposed dentine, contouring, etc. Not only this, but with what other material can we work and leave the indelible impression on the minds of our patients that we are systematic, scientific, and skilful workers?

Using gold as often as it ought to be used, in order to obtain the best results in preserving decayed teeth and preventing decay in other teeth, requires an educated judgment, educated muscles, educated nerves, and very hard work, and compels the operator to be systematic, thorough, and painstaking, and to devote a certain amount of time undisturbed to each patient. The hard work which a first-class gold operation requires of the dentist who does not allow his patients to hurry him is beneficial to health, as all hard work is, provided it is not carried to excess.

Filling teeth with other materials does not require the same physical effort as with gold, and this physical effort, in my opinion, counteracts to a great extent the effects of confinement to, and bad air in, the operating-room.

Our best operators in the United States are healthy men, and they bear their age well. The dentist who is interested in his profession finds enough that is intellectual in his calling to keep his mind occupied and healthy. He comes in contact also with refined people, which is beneficial,—a change of patients giving relief and rest and a healthy variety to his work.

When our hours for receiving are over our cares end for the day, but with the physician it is quite different. His duties are irregular and connected with danger at times, and great responsibility such as we seldom encounter.

Our calling leaves us free to devote a certain part of each day to physical exercise and recreation, and I am convinced the dentist who pays attention to his physical condition can accomplish more as a delicate operator than one who goes on regardless of regularity and health.

A light breakfast and lunch of wholesome food, taken one hour before work, is important for health in our profession. After a hearty meal one ought not to work for several hours.

I have noticed that mountain-climbing is always accompanied with much more fatigue and exhaustion if undertaken after a hearty meal.

Dyspeptics will generally go on a canter immediately after eating heartily, thinking to get relief which they may imagine comes of physical effort, while actual digestion takes place only after they are exhausted and lie down to rest.

Our natures must be very tough to stand the many violations to the laws of health which we are constantly committing. Unfortunately, too many of us do not stand these violations.

The monkey can teach us how to eat. If we watch him, we notice how careful he is to reject the indigestible and irritating parts of everything he consumes, and how carefully he chews everything that enters his stomach.

After my experience in dentistry, I have become firmly convinced that our profession, as we can practise it abroad or at home, is one of the most favorable of all the professions for health and long life, provided we practise it with the intention of sustaining the high reputation we have hitherto enjoyed, and of representing with hard, systematic, and skilful work, united with pride in our moral and physical condition, the best dentists of our native country.

ABRASIONS OF THE TEETH.¹

BY DR. A. F. TOWNSEND, WORCESTER, MASS.

OF the number of phases which this trouble with the teeth presents to the practitioner of dentistry, I shall refer to but one. The character of abrasion which I shall consider is the excessive wearing away of the grinding surfaces of the teeth by mastication. This form of abrasion is the most common, and for that reason calls for treatment more frequently than any other. Every practitioner has

¹ Read at Union Dental Meeting, Boston, October 29, 1890.

more or less experience with it, and while some cases are readily managed, others present a very difficult problem as to the best method to be adopted in their treatment.

In those where the abrasion is but slight and the surfaces of the teeth have the cupped appearance due to the more rapid wearing away of the dentine, I have usually resorted to filling the depressions flush with the surrounding enamel, and have found the results generally satisfactory where the wear in the patient's mouth is not rapid. In some cases I have found this exposed dentine acutely sensitive to touch, aggravated by any acid food, rendering the teeth anything but comfortable.

In treating these acutely sensitive surfaces I have given temporary relief by applying nitrate of silver. I use this agent by scraping into a powder a portion of the caustic from the stick or pencil. A small amount of the powdered caustic is then taken and applied directly to the sensitive surface, and secured there by covering it with a thin layer of cement, and the patient instructed to be careful for a few hours and not dislodge the stopping, at the end of which time they may scale it off themselves. This treatment leaves a blackened surface, and is objectionable where it may show. Sensitive abrasions treated in this manner give a considerable period of comfort. Where more permanent results are demanded, sufficient of the dentine is cut away to get depth enough for a gold filling, which I have sometimes found necessary to insulate by a very thin layer of gutta-percha or cement.

The cases I have so far mentioned are common and occur almost daily in practice.

In the model which I show you the teeth are worn very badly, the inferior incisors suffering the most. All the inferior incisors and cuspids have become worn until death of the pulp has occurred from exposure and have required treatment. The devitalization took place at intervals, if I remember correctly, of about a year.

The surfaces of the dentine are extremely sensitive, but not enough to cause much trouble in mastication. In 1881 or 1882 I had occasion to cap the inferior sixth-year molars and bicuspid, also the superior sixth-year molar on the left side. This was done chiefly on account of the sensitiveness of these particular teeth. This operation has arrested the wearing of the teeth filled, which antagonized only with those which were not filled in the upper jaw. This is shown very clearly in the model. The two lower molars and bicuspid were capped. These have become worn but slightly, while the wear in the corresponding teeth in the upper

jaw, you will observe, has been excessive. The left superior and inferior sixth-year molars have worn about equally. The capping in the inferior molar came out a few months ago on account of the retaining groove on one side being obliterated by wear. The capping was literally worn out. The habit of gritting his teeth adds largely to the natural wear, if it is not the chief cause of this excessive destruction of the surfaces of these teeth. This man is, I think, about forty-five years of age, of a strong, sturdy physique, and will probably continue to grit his teeth as long as he has any, so any operation upon them must necessarily be of a very substantial character to possess any value to him.

For a number of years I have used gold-foil and built up the teeth, in cases like the model, one tooth after another, until I had, in my judgment, a sufficient thickness of gold to last. I think it frequently happens that in operations of this kind, where you desire the greatest durability, you are frequently disappointed. Where there is a great amount of abrasion, you may expect a correspondingly hard wear on the fillings or caps with which you protect the teeth.

One case which I capped in this manner in July, 1883, eighteen teeth were laboriously built up until the caps were a little less than one-eighth of an inch in thickness. I have just found it necessary to repeat this work, as a number of the caps had worn almost through. Four more teeth had to be attended to which were not capped at the time the operation was first done. These caps of pure foil have worn as well as gold could wear under the severe action which was brought to bear upon them. In restoring these caps I used Williams's gold and platina folds, and expect greater durability from its adoption. I have not used this material long enough to have any decided opinion upon its merits for hardness and durability.

My experience with a number of cases of like character had induced me to seek for some more permanent or durable material for this purpose than gold-foil. Amalgam can be used in some instances to advantage, but is not suitable for all conditions, particularly if the operation is to show.

The method employed for the last few years in capping teeth of this class I will attempt to describe. Beginning with a central incisor which is badly worn away, I proceed to grind the tooth level upon its articulating surface. The idea is to make the enamel on a level plane. The edge of enamel is then bevelled with a disk or file; I prefer a disk. Two holes are then drilled, usually one on

each side of the vicinity of the pulp,—assuming that these teeth have live pulps,—to a depth of about one-tenth of an inch or deeper. I have found that depth sufficient for all purposes. I then make a ferrule of pure gold, which I fit accurately to the bevelled edge of the enamel by bevelling the inside edge of the ferrule. The gold should be a trifle larger than required, and only a trifle, as I wish this ferrule to form the surface of my cap, and if made too large it will have to be ground off in finishing. After the ferrule is fitted and made of sufficient height for the thickness of the cap, I take a sheet of No. 4 cohesive foil, which I fold to thirty-two thicknesses and anneal in the alcohol flame. This I lay over the end of the tooth and press it up firmly with my finger, the foil adapting itself very readily to the end of the tooth, with the edges projecting over. I then burnish the foil lightly to the edge. The ferrule is then taken and laid over this piece of foil and pressed firmly into position with the finger, and held there while the pins, which I have previously prepared, are thrust through the thin foil into the holes made in the teeth for them. A piece of beeswax is then taken, about large enough to fill the ferrule, warm it slightly in the hand and press it firmly into the ferrule. It is then removed from the tooth, the wax holding all the pieces in proper position. I then invest it, and after the investment has hardened I wash out the wax with hot water and flow into the ferrule eighteen- or twenty-carat gold solder until it is full. After removing from investment I try it upon the tooth, and with a corundum-stone and burnisher proceed to finish it. After it is roughly finished, I cement into place and then put on the final finish. I have been using this method for capping teeth where a durable cover is needed for some time, and have between thirty and forty caps now in service apparently as secure as ever. The labor of putting them on is not as tiresome for patient or operator as the method of capping with foil, and with a little practice they can be done much more rapidly. This method has not had the test of time which is necessary to prove success or failure, but so far I have every reason to hope for successful results. As eighteen-carat solder is more resisting than gold-foil in like proportion, I expect greater durability.

As the feelings and endurance of the patient are of some consideration in an extensive dental operation, as well as the tax upon nerve and muscle, the operator will find that he can accomplish more work of this character with comparative comfort to himself and patient if the method I have described be adopted.

RAPID OPERATIONS.¹

BY FRANK PERRIN, D.M.D.

IN discussing this subject I would first make a distinction between rapidity and hurry. By the former we understand quickness without confusion; by the latter we understand haste without collected and well-directed thought, which in careful operations must be avoided.

In what I have to say I hope you will not get the idea that it is well to rush dental operations in an undignified manner, giving the patient the idea that your aim is to get through with him as quickly as possible, and be about something else. Still nearly all will realize that the patient will appreciate quickness, and be glad to make his visit to the dentist of as short duration as safety and good work will allow.

The man of business, whose time is crowded to its limit, and who has his own affairs arranged on a time-saving basis, who daily converses over the wire with his friend in New York, or who may telegraph to his agent in Calcutta at four o'clock in the afternoon, and finds the reply on his desk on his return to his office the next morning, easily loses patience when seeing the dentist wasting time. The woman whose affairs at home demand her speedy return, or whose social circle claims her time, soon becomes nervous if she has reason to think the dentist is dilatory.

Everything in the world around us indicates that the age in which we live requires our greatest possibilities, especially when we have not only our own time but that of others in our keeping; it is our duty to use that time to its best advantage, and to use as little as possible.

Even if our patient's time is not worth a dollar to him, the question of our own still remains, and duty to self demands that we make as many dollars in the hours devoted to business as we honestly can. Moreover, what greater satisfaction can a man have to repay him for a day of close application to business than the consciousness that he has accomplished all he could reasonably expect, and by making the best use of his time he has two hours left for recreation.

The art of making haste without hurrying, or of accomplishing the greatest amount of work in a given period is a study, per-

¹ Read before the Harvard Odontological Society, May 28, 1891.

haps a natural accomplishment possessed by some, while to others much careful thought and application are necessary for its attainment.

The first requirement is that the operator's mind be trained to act promptly and with precision. Much time is wasted unless he is able to quickly and correctly map out each stage of the operation at hand in such a way that every step taken is progressive, and each stroke a telling one. After a few seconds thoughtful observation he must decide on the method of procedure, and the instruments best adapted for the purpose, and as far as possible place them for use.

I will venture to suggest a few points in regard to the technique of operating, knowing they must be modified to suit the special requirements of the individual.

The selection and arrangement of instruments is perhaps the first consideration, and I think the number of them should be reduced as much as possible. The young operator is pretty sure to have in his cabinet a great many forms of instruments that are not useful to him. He should by careful study adopt the use of those he finds will best aid him in his work, and remove from the drawers every one he finds not specially adapted to his methods. If this be not done his cabinet will become encumbered with instruments, many of which are never used, and serve only to obstruct and confuse the mind. I do not mean by this to discourage the trial of new forms; this should constantly be done, and their use adopted when found satisfactory.

Engine burrs should be kept in regular order,—a row in the rack for each form, graded according to size.

The use of an assistant can be brought to an almost unlimited state of perfection. A wide-awake boy or girl, who has been well trained, may in various ways save the dentist's time, taking care of instruments, washing them, and keeping them in their places, and passing the required ones wanted during an operation; prepare the filling materials for use, passing medicine and other preparations, which the operator should call by an affixed number, thus in many cases avoiding the unpleasant disturbance of the patient's mind by hearing a drug of fearful name asked for; prepare absorbent materials, assist in adjusting the dam, etc.

Ventilation of the operating-rooms is also desirable, which the assistant can attend to as each patient is dismissed. The last and most important point I shall mention, and upon which all else depends, is that of health. A dentist must not expect to accomplish

much if by any reason his physical strength is at a low ebb. Mind and body are alike strained, and the nervous energy often severely taxed.

There is a limit beyond which it is impossible to go. The ambitious man must carefully watch his strength and regulate his practice to suit his ability to bear. A dentist may have strength enough to enable him to continue at work, but in order to do this rapidly and well he must have a certain amount of reserved power and energy.

The mental forces should be allowed relaxation at regular intervals. To accomplish this an entire change of thought is required, which may be obtained by various means. We would suggest activities which may give direct play to other faculties than those used in the practice of our profession,—music, painting, botany, or even the much-followed photography. These will vary the line of thought, and give rest to overworked nerves, besides developing faculties otherwise unused. Physical exercise should be taken daily in some form,—by gymnasium practice, bicycle or horse-back riding. And not only does the dentist himself reap the benefit of suitable recreation but his patient is also affected. Overstrained nerves produce irritability which will act directly on many individuals. In fact one's physical and nervous condition may be reflected and observed in the condition of another as quickly as the administration of an anæsthetic. Anxiety of mind is also easily reflected by the patient.

The power of a healthy, well-balanced mind over one which often has been strained and racked before coming to ask our assistance is as yet not fully realized.

To have at his command a supply of reserved vigor will enable the dentist to push to successful and rapid completion a difficult and tedious operation, which must drag if he has not received a supply of strength and inspiration within twenty-four hours.

Many points which may be used to increase rapidity I have not mentioned, but some of these simple suggestions will help if we apply them.

Reports of Society Meetings.

AMERICAN DENTAL ASSOCIATION.

August 5, 1891.—Second Day.—Morning Session.

MEETING called to order at 9.40 o'clock.

The President announced that the paper read by Dr. Custer, of Dayton, Ohio, was open for discussion. There being none, the following paper was read by Professor Peirce:

THE DENTITION OF THE FELIDÆ.

BY ALTON H. THOMPSON, D.D.S., TOPEKA, KANSAS.

The dentition of the true cat presents an interesting subject for study, on account of being a conspicuous example of a highly specialized dental organization. The extremes of form among the teeth of animals indicate the great possibilities of variation, and thereby throw light on less highly specialized forms, in which extremes are modified, and compromised forms or composites are developed which are adapted to more or less mixed diets.

Special and extreme forms of diet, of course, lead to the evolution of special and extreme dental organizations, which must necessarily be adapted to the food employed, and which the animal prefers to employ.

The carnivorous animals, having become adapted through countless generations to an exclusive dietary,—the flesh of other animals,—have in their dental organizations been modified and specialized to accommodate them to such a diet, and present forms peculiarly and specially adapted to it. In other highly specialized forms, as the herbivora, of course, the same rule holds true, but it does not hold with animals of a mixed diet, in which the dentition is modified and extremes are reduced and compromised to adapt the teeth to varied foods.

In the true Felidæ, as in the true herbivora, however, the teeth are extremely modified to adapt them to an extreme diet, and this class, therefore, presents an interesting example of high specialization for study.

The whole order of the carnivora, or flesh-eaters, embracing cats, dogs, bears, and their allies, present a high order of development.

"The canine on each side is very much lengthened, is sharply pointed, and recurved for seizing, holding, and tearing prey. The upper canine is separated from the incisors by an interval,—a diastema,—the lower canine being received into this space. The incisors are small, short, blunt, and always six in number, and stand nearly in a straight line across the front of the jaw. The outer incisor is sometimes large and pointed like the canine. These anterior teeth are tolerably uniform throughout the order, but the molars vary much in form and number, in accordance with the diet.

"In the most purely carnivorous members of the order, the Felidæ, the true molars are reduced in number on each side, and the cusps are produced into long cutting blades,—the sectorial teeth. In the bears, on the other hand, the molars are more numerous, and are furnished with obtuse and rounded cusps. The fourth premolar in the cat is the largest of the molar series, and is the main cutting tooth. The crown is divided into two parts,—the one a thin, sharp-edged blade which runs in an antero-posterior direction and is sometimes divided by notches into two or more cusps; the other part, the tubercle, is a shorter and blunt cusp, situated on the inner side of the anterior end of the blade. In the pure flesh-eaters the blade is well developed, and the tubercle of less size than in the mixed feeders. The lower tooth opposed to this is the first true molar, and in the Felidæ consists solely of a blade, which is divided into two large cusps and a rudimentary cusp behind."¹

In a general way, the characters which indicate a pure flesh diet are undersize of the incisors, large, deeply-implanted canines, wide diastema, reduction of the molar series, cutting blades on the molars, etc.

The true molar is a small tooth, and is scarcely visible from the outside of the jaw. The lower first molar consists of a blade only divided by a V-shaped notch. The first premolars are much reduced and often are scarcely visible. The formula of the family of the Felidæ is as follows:

$$I. \frac{3}{2} = c. \frac{1}{1} = p. m. \frac{3}{2} = m. \frac{1}{1} = 15 = 30.$$

"The blades of the molars pass each other like the blades of scissors in express relation to cutting of flesh. The compressed trenchant part of the molars forms a sharp edge, more or less deeply cleft in different genera. This blade is usually accompanied by one or more basal tubercles. The blade of the upper sectorial tooth always

¹ Charles Tomes's "Dental Anatomy," p. 375.

lays upon the outside, and a little in advance of the lower sectorial. The upper permanent sectorial succeeds and displaces a deciduous tubercular molar in all carnivora, and is therefore essentially a premolar tooth. The lower sectorial comes up behind a deciduous series, and has no immediate predecessor, and is therefore a true molar. In no other groups of animals are the jaws so well and so variously armed with dental organs. The vacancies are only sufficient to allow of the interlocking of the strong canines, which are formidable and efficient weapons for seizing living prey, and lacerating and dividing flesh. The incisors are well adapted for scraping and gnawing bone, the sectorials for cutting flesh and dividing resisting fibrous tissues, and the tubercles for cracking and crushing bone. The jaws are short, the muscles strong, the articulation a mere hinge, so that it limits jaw movements to the vertical alone."¹

There is not much mastication or insalivation of food in this order, as the flesh food is readily digested. The simple stomach and short intestine indicate also that they subsist on a food easily digested. The whole alimentary system indicates a simple diet which requires but little preparation for assimilation. It is simplicity itself, when compared with the complicated masticating apparatus and extensive digestive system of herbivorous animals, whose diet is resisting and unfit for assimilation, and requires extensive manipulation to prepare it for the building of animal tissue.

It is highly interesting to pursue the subject into the field of evolution, and to study the process by which such a highly specialized organization arose.

Professor E. D. Cope ("Origin of the Fittest," page 363) says, "The primitive dentition has been modified in two directions,—viz., to form teeth for grinding and a sectorial dentition. The specially developed teeth of the carnivora are the canines and sectorials. The successive modifications of forms which have resulted in the existing specialized lower sectorial tooth of the *Felidæ* consists in the gradual obliteration of the internal and posterior tubercles, and the enlargement of the external anterior tubercles in connection with an additional anterior tubercle.

"The modification of the characters of the dentition, taken as a whole, consists in the reduction of the number of the teeth and the manner of their specialization.

¹ Richard Owen, "Odontography," 1840, p. 490.

"Observation of the movement of the jaws of the *carnivora* shows that they produce a shearing motion of the inferior against the superior teeth. This is quite distinct from the sub-horizontal movements of *ruminants*, or the vertical motion of hogs or monkeys. In the crowns of the *sectorials*, the inner side of the superior and the outer side of the inferior, are worn in the process of mastication.

"The cutting of cartilages and tough tissues is best accomplished by the shearing of the outer edge of the lower molars on the inner edge of the external tubercles of the superior teeth in simple tuberculate teeth, the jaw being too wide to shear on the inner side of the tubercle of the superior series, so the cusps of both upper and lower teeth which engage in this process are developed in elevation at the expense of those not engaged in it,—*i.e.*, the internal cusps of the same teeth.

"The atrophy of the latter are not due to friction, but to disuse, while the effect of use has lengthened the external cusps in the *carnivora*, and has resulted in a plain, grinding surface in the *ungulata*. The position of the *sectorial* tooth is just at the front of the *masseter* muscle, where the greatest amount of force can be brought to bear upon it. The last molars are not modified in the *sectorial* teeth in the modern *carnivora*, as they are in some extinct forms in the development of the prehensile character of the canine teeth.

"The prehensile character of the *sectorial* teeth or the *premolars* was lost. Extinct forms snapped their prey, as is seen in some existing dogs with long jaws, which do not permit of the lacerating power of the canines, as in the *Felidæ*. The latter have the *masseter* muscle situated more anteriorly, in order to render the canines more effective. This muscle has advanced from behind forward in the development of the *carnivorous* types."

Dr. John A. Ryder, in describing the mechanical genesis of tooth-forms, says,—¹

"The dentition of the *carnivora* or *feræ* is *bunodont*, the jaws wide, with the tubercles latterly compressed into sharp edges to cut prey. The mandibular movement is *ginglynoid*, and admits of the least lateral movement; all that is admissible is that which is effected by the lateral sliding of the cylindroid condyles in the glenoid cavities, but the effect is, however, widely different from the lateral movement observed in the *ungulata*.

¹ Proceedings of the Academy of Natural Sciences of Philadelphia, 1878, p. 48.

"The passage from the archetype bunodont tooth to the scissor-like (carnassial) sectorial form is plainly exhibited by selecting a series leading from the lowest of both ancient and modern forms up to the Felidæ as the centre of specialization. The characteristic cylindroid condyle of the cat is probably formed to resist the pulling action which that animal exhibits when holding down prey with the paws, as this prevents the drawing of the jaw forward."

This compels the single movement of opening and closing the jaw, and this gives rise to the peculiar form of tooth with sharp, blade-like cusps so well adapted to the food employed. The tooth is developed in a vertical direction on account of vertical movement, but latterly, as in the herbivora, which have lateral movement of the jaws. Types of teeth have been developed in accordance with the amount and direction of mandibular movement, and the teeth of the Felidæ are formed in accordance with this rule. Cusp duplication is effected by this movement, as pointed out by Professor Cope and Professor Harrison Allen (*Dental Cosmos*, vol. xvi. p. 617), by the thickening of the tooth in a lateral longitudinal or oblique direction in obedience to the growth of force.

"The development of a bicuspid or quadricuspid tooth is effected by repetition of the cuspid or incisor forms by the functional development of the cingules at the base of the crowns, which are developed in the cusps."

In this manner repetition of cusps arose and duplication became possible. In the ruminating ungulates this duplication is more extensive than in the carnivora, in which a simplicity in this respect is maintained, but a growth of the cusps is manifested for a special purpose.

The most highly specialized teeth in the Felidæ are therefore the sectorial premolars, and the prehensile canines, which are characteristic. Those teeth place this family at the head of the carnivora as the most highly specialized members of the order. They furnish an example of dental variation that is quite remarkable when studied in its minutiae. Other orders furnish examples of extreme specialization, which are also quite interesting and instructive.

The President.—Gentlemen, Dr. Corydon-Palmer wishes to say a few words to you.

Dr. Corydon-Palmer then unveiled a portrait of the late Dr. William H. Atkinson.

Dr. Corydon-Palmer.—I think the portrait will speak for itself. It was painted by Mr. J. W. Bell, who is a particular friend of

mine. It shows Dr. Atkinson as he was in life, when we knew him and loved him most. I present it here with the hope that some time we may have a place where such valuable things can be taken care of, and, if there ever should be, this may be had for the beginning of a collection of portraits. There are portraits of the oldest practitioners in this country, and I would propose that copies of them be made, and that they should be arranged at some place so that we may have them to look upon; that we may remember them as we have seen them in life.

The President.—Gentlemen, Dr. Palmer spoke to me last night, —that he had a matter to present to this society. I told him that in consideration of his being one of the old members of this association that I would grant him that privilege. I am sure you are all gratified to see the likeness of our first-elected president. This is, I understand, a gift to this society, when we have a place where we can hang it, and I think that Dr. Palmer should receive our thanks for this pleasant surprise.

Dr. Abbott moved a vote of thanks.

Carried.

DISCUSSION.

Dr. Barrett.—The presentation of such a paper as this and its passage without any discussion would seem to show indifference on the part of intelligent dentists. It seems to me that if we profess to be scientific men we must consider something besides that from which we earn our daily bread. Of course, we are studying human teeth, because we are always at them. That is professional work, not scientific; but if we consider the dentitions generally, of the whole order of vertebrates, then we are doing scientific work, and this paper is a scientific one, strictly and technically. It is not a practical paper; it is not professional work. It is in the line of true science, and therefore I desire the chance to say something upon it.

Dr. Thompson has followed Huxley mainly. Most homologists have followed the classification of Cuvier as the proper one, still in the latter days his system of division of the teeth and his method of regarding them has fallen into decadence.

The sectorial teeth, of which the paper treats so much, are between the last molar and the first premolar, which have become specialized in certain orders; but Cuvier's system of regarding the teeth was somewhat different from this. We divide the teeth into incisors, cuspids, premolars, and molars, molars being those which

succeed the deciduous molars; but Cuvier's formula divided them into incisors, cuspids, false molars, carneous, and tubercular molars.

The carneous are those which are called sectorial teeth. In Cuvier's system there are no sectorial teeth, consequently he is obliged to introduce another kind of teeth, which he calls false molars, and it seems to me that therefore his system is somewhat weak.

If there be a great archetype of dentition, it would be, in my opinion, that of forty-eight teeth. I do not say that all the dentitions have been modified from some great archetype. The true archetype to-day of the unculata is probably forty-four, but I believe that the great archetype is forty-eight, and in that case the formula would be written in this way:

$$\frac{3-3}{3-3} \text{ c. } \frac{1-1}{1-1} \text{ p. m. } \frac{4-4}{4-4} \text{ m. } \frac{4-4}{4-4} = 48.$$

There are six incisors; the premolars are 4—4, the molars are 4—4, equalling forty-eight teeth.

It is not at all certain but that the incisors are 4—4, but if there be a typical dentition that is it.

In the Felidæ, in which the teeth have become so materially changed, there has been a dropping from this end of the mouth; from the anterior portion of the mouth there have been none lost. Then we have the premolars modified, and we have the molars drop to 1—1, and the sectorial teeth are the last of these, the third molar and the first true molar.

In the Owen method he has changed that, and has made the last premolar; that tooth does not succeed a deciduous molar, consequently I do not believe it to be a premolar. How is it that from the posterior portion of the mouth so many have been lost, while on the anterior side there have been none lost? The premolars being small, and there being space between them, how comes it?

Most of the homologists claim, and I think Dr. Thompson does, that it is through the selection of the food that the sectorials are produced,—by the food upon which they live; but the question comes back to us, Which was first, the egg or the hen? and it is a question that I do not know can be perfectly answered to-day.

Did the first fowl come from the egg or did the egg come from the fowl? It must necessarily follow that one of them was first, but which was it? If the doctrine of evolution be true, there may have been an evolution from some other form.

In the canines, which are related to this class, we have a still

less modified dentition than in the Felidæ; and the dentition of the canines equals forty-two. In the canines we find that the modification is less than in the Felidæ, but there is no reason to suppose that the canines preceded the Felidæ, and that the Felidæ are a still further modification from the great archetype of the dentition than are the canines.

Cuvier divided the feline dentition into the incisors, the canines, the false molars, the carneous, and the true molars; and he has in the molar system the false molars, 3—3, 4—4; the carneous, 1—1, 1—1; the tubercular molars, 2—2, 2—2; consequently he has introduced the carneous molar there in place of the sectorial tooth.

In this dentition, taking that as the great archetype, we see that in the human dentition there has been lost a molar on each side,—you have lost two premolars and one incisor from each side. That some of the teeth are, and that the wisdom tooth is now, in a condition of being entirely suppressed, seems to me quite probable. You may say that during the historical period there have been no indications of its suppression, but the historical period is but a drop in the ocean of time that has fled during the past. It is almost as nothing, and the time is altogether too short to trace any peculiar modifications. I have seen repeatedly in the gorilla a fourth molar that was not at all a molar, that could be considered in any sense a supernumerary molar. It is sometimes found in the human family. It is not in any sense a supernumerary tooth, but evidently belongs in the perfect succession, for it has all the perfection of any of the molars, so that it would look as though there had been a suppression here; and that there has been a suppression in incisors is proven by the occasional appearance of a third incisor, so that there is undoubtedly a modification in the human dentition.

There may also have been a modification of dentition in the Felidæ. Understand, gentlemen, I am not here to urge the claims of evolution by any means; and there are very few that understand evolution exactly as I believe it to be, and as most of the authorities do. For instance, some gentlemen suppose that evolution means, "Was your grandfather a monkey?" It has nothing whatever to do with that. The true doctrine of evolution would be this: that from a single organic cell there began a differentiation and development which resulted finally in the Felidæ. In another direction it resulted in the ungulata; in another, in the rodentia; in another direction it resulted in man; but that man was ever a monkey or a long-tailed rat is not proven at all.

But that the dentition has been modified by surroundings is

clearly and unmistakably proven, and if the dentition has been modified by the environments, it is quite probable that the form and shape of the teeth may have been changed also.

Owen's method is from the forms or shapes of the teeth; that is not entirely perfect. The shape of the tooth does not always indicate its offices.

I do not know of any class of men that are more competent to follow this line of study, provided they pay attention to it and are sufficiently educated for it, than the dentists. None have a better opportunity to study it; to none is it so near in their daily work as to the dentists; and if the problem is to be solved, I think the dentists should solve it, and the direction of the professional mind should tend to the clearing up of this scientific question. We have been altogether too practical. We should get to a point where we can look at something besides amalgam and red rubber. We should consider some higher problems and put ourselves upon the plane of science, and then we shall be accepted by scientific men, but until then we cannot consider ourselves as studying science in any way.

Dr. Peirce.—When a paper such as Dr. Thompson's is read before a body of specialists, the query comes at once, Can we draw a lesson from it that has application to our daily labors? Can we make it available in our specialty? In the few moments that I have upon this floor, I want to see if that is possible. We have learned from our previous studies, as well as from the paper just read, that the carnivora embraces three or four varieties. They are all either flesh-eaters or fish-eaters. They vary in their habits and in their environments, and in proportion as they vary in their food habit and means of getting their diet, so do their teeth and the shape of their heads vary, although they have a general resemblance, being all classed with the carnivora. We have this order—the carnivora—divided into the terrestrial, the aquatic, the arboreal, and the fossorial. And though feeders upon flesh and fish, they vary, and just in proportion as they have become specialized in their life habits, their teeth have become thoroughly adapted and fixed in shape and number with a recognized tendency to a reduction in the number. This is apparently the law; as an animal becomes specialized in his habits, the number of teeth are never increased, but invariably reduced, as compared with those of the ancestral type.

This fact I want noted as recognized in several mammalian forms; you all know that the typical number of teeth for the horse

has been forty-four, and it is also stated as the typical number for the mammalia. The modern, and especially the thorough-bred, horse has four of these teeth becoming rudimentary; so he has but forty permanent teeth. The specialization of that animal has cost it four teeth. Whether that is due entirely to diet and non-use, or to the intensification of the nervous system and diversion of nutrition, has never been settled. I think probably it is as much due to the one as to the other.

You are also familiar with the fact that man belongs to the order of mammalia, and indulges in an omnivorous diet. By virtue of that diet the teeth are asking, Which way? Are we settling down to a specialization that can better adapt these organs to their needs, to their function? My own impression is that one of the principal factors in the decay of the human teeth is because they are in a transitional condition. The human family is not yet old enough or enough limited in diet to have them become specialized, and so our teeth are waiting and, as I just said, asking, "Which way?" and until we can say to them, "This is our diet, and shall be our diet for hundreds or thousands of years," we will have that uncertainty in their durability and number.

Towards a reduction in number you all know that the human family is looking by the loss of the four third molars. Thirty-two is the number we count. How many patients have we with but twenty-eight? Thousands of them, I imagine. Then, again, let us take the races that live entirely upon vegetable food,—rice, as the Chinese; with them we find a very marked suppression in the cuspid or canine teeth. I assert this is true because of the absence of a meat diet. These are carnivorous teeth. We find with this limited and exclusive diet a marked increase in size of the incisors, to compensate for the marked characteristic suppression of the canines. I make this remark based upon the observations of others and upon conversation with many who have travelled and worked among these people. It therefore must be taken with the degree of uncertainty belonging to such sources of information.

If it be true, however, it is in this same evolutionary line; but instead of dentists suggesting, as often has been the case, that the human family will eventually become edentulous, let us be assured that the human family will have just the number and shape of teeth needed for its habits. If you can pick out from patients families who live upon a solid diet,—upon dry foods,—and use their teeth for mastication, and saliva for insalivation without washing it into the stomach, minus these essential requirements, you will

select the families with whom you have the least trouble in saving their teeth, and in whose teeth fillings have greater durability than others, and whose mouths will be purer and cleaner in every respect than those who pursue the opposite course.

Dr. Carroll.—I did not have the pleasure of hearing the paper read. I very much regret it, but I have had the pleasure of listening to the remarks of the gentleman from Buffalo. I wish to make one observation touching the remark of Dr. Peirce. He said that loss of the canine teeth, the teeth of the Chinese, or any rice-eating people, indicates a specialization,—that is, that we are being specialized in a certain direction. That is in opposition to a conception I had regarding the use of the teeth, which I would desire to speak about. It is not original with me, but the term “canine” or the dog-tooth, is a misnomer, as applied to the mammal called man.

If you watch the nut-eating animal called the gorilla, or the monkey, or any of that family, and put into his mouth a nut to crack, you will see that he takes it and carries it back of the bicuspids to the molars, and carefully places it there with his tongue and with the organs that surround it in the cheeks. He feels his way before he cracks the nut, and in feeling his way he passes the lower cuspid beneath the upper cuspid, and then cracks the nut. What does that teach us? The same thing that teaches us regarding man,—that the incisors are for incising or cutting; that the cuspids are not to tear, like a dog, for you do not tear your food, but you use them as a dowel. The gorilla, or the animal that has the longer cuspids, longer than man, places them so that when they pass each other they hold that nut in a position not to fracture the jaw, or as a dowel. He will not crack the nut until he has that cuspid in position with the other cuspid, and this was not indicated by the speaker last on the floor, whose remarks were so clever and interesting, and entirely truthful up to that point; but I think that point of observation is in error. Hence I say that mammals are not intended to tear their food, and those teeth should not be called canines, or dog-teeth. As the lower maxilla, the back part, the condyle of the inferior maxilla, slopes upward, the upper maxilla slopes to correspond with it, so you have a pressing of the two maxillæ in the act of mastication from the back part, and we have a pressing on the other part from the cuspidata.

Dr. Barrett.—If we take the Australian continent we find the dentition entirely modified. All of the animals, as far as I can learn, indigenous to the continent, were originally probably marsupial. The didelphia have a peculiar modification of the molar

teeth in this, that the type is reversed,—that is, the typical number of molars is completely reversed. The carnivora indigenous to Australia are marsupial carnivora; the ungulata are marsupial ungulata. I do not believe that they all produce their young in the same way, but I think they have been modified to the type of marsupials. They reverse the order of the molars and the premolars; you find that constantly in the Australian continent, in those animals indigenous to the continent.

When we take that into consideration with some of the other facts in the paper, we find that it leads us to certain conclusions which cannot be avoided. Those conclusions you can draw for yourselves. It is for you to do it, and you can then understand and comprehend something of what the homologists are doing. The Australian continent is peculiar because the dentition is modified to the marsupial kind.

Dr. James Truman.—I would like to ask Professor Peirce one question. He said that there were thousands of human mouths where they have lost the wisdom tooth entirely. What evidence has he of that? He also stated that the canine tooth was the typical carnivorous tooth. I have always been taught that the sectorial tooth was the typical carnivorous tooth.

Dr. Peirce.—A remark in Dr. Thompson's paper was to the effect that Professors Cope and Allen stated that the typical carnivorous teeth were what we call the cuspid teeth and the sectorial molars. Those two were the typical teeth of the carnivora. I did state that they are the typical teeth of the carnivora; they are always present. The length or prominence of the cuspid tooth marks the carnivorous type. I stated there were thousands of families where the number of human teeth had been reduced to twenty-eight. I base my statement on this fact: I have at least twenty patients in my practice where that tooth never has and never will erupt. If I should have twenty individuals in my practice—very limited as it is—where that tooth never has and never will appear, I am justified in saying there are thousands of the human family where it never has and never will appear. So common is this occurrence that the scientific world recognizes it. It is noted in many scientific articles that the human family is fast losing four of its permanent teeth, largely the third molar, though in some families it is the lateral incisor. I do believe that the third molar is gradually disappearing from the human mouth, and if I may be allowed another moment, I would like to refer to the evidence of this. If we go back to the animals that are supposed to be ancestral to, or at least

more closely allied to, the human family than others, we find first thirty-six teeth, then thirty-four, and then thirty-two. Now, we take the monkeys. Some of them have thirty-four teeth, and some of the lemurs thirty-six, and there is also an abundance of room between the last tooth and the ramus. We take the gorilla and the lower races of men, and we find thirty-two teeth all in place, with quite room for an additional tooth between the third molar and the ramus. Not only that, but we find the third molar equally large with the first and second. I have examined many jaws—some quite recently—for the benefit of Dr. Patrick. In many of them the third molar is fully as large as the first. In the human family (cultured) to-day the third molar is invariably smaller than either the first or the second. The conclusion naturally to be drawn is that there is a tendency to its suppression.

Dr. James Truman.—I would like to make another inquiry. You answer that the wisdom tooth, because it is not present in the jaw; you infer, therefore, that it is not in the jaw at all. Suppose you were to make an autopsy of that jaw and find the wisdom tooth in the ramus, what would you suppose?

Dr. Peirce.—There are hundreds of molars that have the germs started and are never completed. I find in my practice third molars coming through at fifty years of age, due to the absorption of superimposed tissue. They are imperfect in their development, which is an evidence of tendency to suppression. I think it is universally conceded that the third molar is invariably smaller than the first or second. The durability, too, is doubtful. Which tooth after the age of twenty-five is the one most frequently lost? The third molar. It is the perishable tooth subsequent to that age, or rather between the ages of twenty-five and forty.

Dr. Barrett.—Are you positive that any of the monkeys have a dentition of thirty-six teeth, and if you are, can you give me the class?

Dr. Peirce.—I alluded to the lemurs as having thirty-six. The monkeys, several varieties, have thirty-four.

Dr. Truman.—What means the excessive development of the cuspid teeth in the vegetable feeders, as in the camel?

Dr. Peirce.—The excessive development may be the transmission of an ancestral condition. Some of the vegetable feeders may not have been long enough such to suppress them. The camel, for instance, may have used his as prehensile organs. As compared with those of carnivorous animals, however, their characteristics are suppressed.

Dr. Brophy.—I understood the professor to say that the third molar in the human subject is invariably smaller than any of the others. Is that correct?

Dr. Peirce.—I said so,—yes.

Dr. Brophy.—Is it not a fact that the third molar is larger and broader, and the crown larger than the others?

Dr. Peirce.—Invariably it is smaller. Occasionally it is larger. Those are exceptional cases.

Dr. Brophy.—The discussion on this subject will not be lengthened by what I have to say; although I am not a close observer of the conditions that have been discussed, I have observed this: that the lateral incisor is almost as frequently found absent as the third molar; and in conversation with Dr. Black, not long ago, he agreed with me that the lateral incisor tooth was almost as often absent as the third molar. It may be that during this process the third molar will disappear in time. I am convinced, however, that the incisor has disappeared in certain families. It has been absent in three generations in some cases. What can we prove by that? It may not be in the exact line of scientific discussion that we are engaged in, but the question is, "How can we account for it?"

Dr. Peirce.—I want to make just one remark regarding the difference between the loss of the incisor and third molar. I simply give this as my own observation. Dr. Brophy said that there were families where the lateral incisor was absent. The deficiency of this tooth in either one or both parents is more likely, it seems to me, to be transmitted to the child than the deficiency of the third molar. The deficiency of the third molar, I deem, comes through an evolutionary process,—want of use and want of room,—and may or may not be deficient in children as ancestral tendencies are strong or weak.

Dr. Morgan.—He assumes that the loss of this incisor and of the molar is the result of the non-use of the tooth, if I understand his views,—that it is lost because there is no longer any use for it. What I want him to tell me is this: The inferior incisors are not lost. They are of less use than the upper, the superior incisors. They are of less importance for any of the purposes for which they are used, and yet we find them lost in the superior maxilla and they are retained in the inferior. If his theory be correct, they must be lost alike in both maxillæ. It seems to me that there should be a way to explain it.

Dr. Peirce.—The doctor is not correct when he says I assume

the lateral incisor is lost for want of use. The third molar is subject to that law of specialization,—non-use,—but not the incisor.

Dr. Morgan.—Why not all of the upper teeth under the same law?

Dr. Peirce.—I can only give the results of the facts as they exist. I do not know why not. All through the animal world the loss of premolars is noticeable. Some of the monkeys have lost the premolars, not the third molars. Man has lost an additional premolar. The third molar is now in process of suppression for want of use and room.

Dr. Rhein.—The remarks made by Professor Morgan were very interesting to me, because they were just what was uppermost in my mind at the time,—that specialization of the human race, if it were tending to the loss of the teeth, could not very well involve the loss of any of the central incisors, or of any of the incisors, and the fact that we meet with the loss so frequently of the superior lateral incisors is undoubtedly a very interesting point in conjunction with this question. The argument put forth by Professor Morgan, that we do not find it in the inferior laterals, is a very strong one against the theory that its loss is in the same line as the other molars. I have had a theory in regard to the loss of the superior lateral incisors for a number of years, and I feel very strongly urged to present it here: The theory was suggested to me by a couple of cases where I could distinctly trace back, at some later day, a condition of double harelip in the family. We know that invariably where there is double harelip it involves right in that portion the germs of the lateral incisors, and it is not at all strange to find in such cases—and we have plenty of them—that the lateral incisors are absolutely lacking. We see cases in children where they have been operated on, and sometimes they have not even the central incisors. I have only in two cases out of a number I have observed been able to trace back any hereditary condition of this sort, but it seems a very natural thing that, if such a condition existed in the past, in the natural course of heredity it would be transmitted to the succeeding generations. I merely offer it as a suggestion towards the elucidation of this very interesting point in the discussion of this subject.

Dr. Marshall.—I would like to know if I understand Dr. Peirce to say that man had lost a premolar?

Dr. Peirce.—As compared with the dentition of the monkey.

Dr. Marshall.—Does he mean that we are really descended from the monkey?

Dr. Peirce.—There is not time to discuss that now.

Dr. Marshall.—I should like, for the edification of this body, that he should give us some facts about this. I have not yet learned that there were three premolars in any prehistoric skull. I never heard such a claim made before.

Subject passed.

Dr. Barrett.—I congratulate the association upon the fact of its sitting and listening to such a technical discussion for so long.

DISEASES OF THE ORAL MUCOUS MEMBRANE.

BY DR. J. D. PATTERSON.

This subject has been very much neglected, because its importance has been underrated. Until the agitation brought about by investigation of the disease called *pyorrhœa alveolaris* there had been little attention paid to diseases of the mucous membrane. Since then investigators have recognized more the importance to the dental practitioner of a thorough knowledge of the etiology and pathology of these complaints.

The inception of the irritation by which we have diseases of the oral mucous membrane may be divided as follows: Accidental, constitutional, and hereditary.

I desire in this article to specially call your attention to some of the accidental causes. They are very numerous. The irritation may be mechanical alone, or it may be from the invasion of micro-organisms, from absence of hygienic care, from disease, from infection, or from functional disturbance without mechanical aid.

We will first consider the cause of disease by an arrest of its function. The dental profession has not given thought to this line of investigation so much as to the search for constitutional conditions, and therefore, I believe, have signally failed to explain the etiology of certain symptoms, especially in the early stages of *pyorrhœa*.

In glancing at the anatomy of the membrane, it may be described as follows: A layer of epithelium; a connective tissue framework and glands underneath, separating the epithelial layer and provided with blood-vessels, lymphatics, and nerves. Whatever interferes with and changes the normal condition of the membrane may overcome its safeguards, and disease is the result.

Any marked deviation from the normal heat of the tissues—namely, 98°—results in morbid changes. Heat-production goes

on all over the body. When any of the tissues are subject to cold, the production is stopped, and morbid action may occur. In the mouth the contraction of the membrane is the first step, accompanied by stoppage of the mucous secretion. We have increased nutrition; an over-production of the mucous secretion, a slightly reddened tissue from the same cause, an abundant diffusion of serum escapes. As the inflammation progresses, we see the discharge becoming a purulent one. Micro-organisms now make their invasion, and assist in the advancing stages of the disease. These soon extend below the epithelium and the membrane swells and thickens.

Let it be borne in mind that up to an advanced stage there is not, of necessity, any presence of pathogenic or non-pathogenic micro-organisms.

The hereditary condition of tissue and constitutional environments are in these cases merely predisposing factors. In some cases it is not to be doubted that constitutional conditions figure largely, and the mucous membrane is at the inception of the disease involved; but there are greater factors which explain other symptoms without seeking in the field of bodily conditions.

I pass now to another irritant,—the prevalent practice of mouth-breathing. Leaving out of the question the change in the temperature, we find that the air inspired rapidly dries the surface of the mucous membrane, stopping the mucus-ducts until the same train of symptoms from destroyed functions already described is established. When a subject is presented who from one cause or another breathes through the mouth, the operator may at once predict the condition of the mucous membrane. Here we have again a numerous class of cases where undeniably the disease has arisen from the gradual drying of the naturally moist lubricating surface by the introduction of an atmosphere which is not normal to the tissue.

The condition that is described as arising from the interference with the functions is not a result of mouth-breathing alone. It may result from different causes. It is seen in infection from catarrhal, croupous, diphtheritic, or tubercular surroundings. They are superinduced sometimes by medicinal treatment, by mechanical irritants, and by uncleanness. We find that while the cause of the described conditions may be varied, and that the cause will affect the malignancy of the disease, yet the symptoms are very similar.

This condition is a disturbed function. One of the chief symptoms is an abnormal secretion of the mucous pus.

In the oral cavity the train of symptoms we have described

meets with conditions which rapidly further the inflammatory process. We refer to the dental organs. These symptoms continue, and finally develop into what is called pyorrhœa alveolaris, which is a condition which naturally results from this.

In diseases of the membrane of the mouth, resulting in what is familiarly known as pyorrhœa alveolaris, different authors are opposed to the term "catarrhal" in describing the clinical appearance. They consider catarrh a special disease of certain membranes, which ultimately leads to ulceration. It is not so at all. It is simply a condition of discharge, and not a disease of special cause.

Another somewhat prevalent idea entertained by the profession is that there is a peculiar systemic condition under which the patient becomes liable to catarrhal inflammation.

Dr. Bosworth says, "I know of no such condition, and there is no good ground for the assertion. My clinical observation also fails to justify this view in any manner." ("Diseases of the Throat and Nose," p. 101.)

Another argument against classifying these diseases of the oral mucous membrane as "catarrhal" comes from those who lay great stress upon climatic influence. They find in climates where catarrh is almost unknown, many cases of pyorrhœa, and, on the contrary, where catarrhs are endemic, find no increase in the number of those suffering from discharge from the oral mucous membrane.

I think this statement should be considered a very loose one. It was formerly supposed that more of these diseases were in America than in Europe, but this has been disproved. There can be no question that the change of climate works wonders in catarrhal trouble, but that climatic influence is an important factor in its causation is open to question.

In leaving the question for your discussion, I leave with you the following considerations:

First. That the inception of disease in the membrane, where the cause is obscure, is often to be found in the arrest of function in that membrane by shock, by catching cold, or by mouth-breathing, by which the moist lubricated membrane is destroyed, rather than by hereditary conditions, or the invasion of micro-organisms.

Second. That the irritated mucous membrane, which we find in abnormal quantities, is not pathognomonic of any special irritation, but is simply a condition.

Third. That this condition is properly termed catarrh.

Fourth. Catarrh is not a special disease; merely a condition of disease.

Fifth. That the name pyorrhœa alveolaris simply denotes a stage of this catarrh in the oral mucous membrane, and may result from a great variety of causes.

PHAGOCYTOSIS.

BY DR. H. A. SMITH.

A correct knowledge of the life of cells forms the basis of physiology. A cell may be defined as a nucleated mass of protoplasm of microscopic size, which possesses sufficient individuality to form a life history of its own; originating from some pre-existing cell, it grows, reproduces itself, and dies.

The file of physiological activities of protoplasm may be studied in the amœba. They are,—

1. Power of spontaneous movement, called amœboid movement.
2. Irritability and power of response to stimuli.
3. Nutritive powers,—the ability to take in food and build up tissues by assimilation and rejecting what is not assimilated.
4. Retro-active powers.
5. Decay and death of cells.

But our purpose is to call attention to the white corpuscles or leucocytes of the human blood, and refer especially to their amœboid movement, first described by Wharton Jones. These leucocytes are simple spherical masses of protoplasm, without cell wall, "but in spite of their simple organization, they act as other creatures do."

Their power of spontaneous movement is accomplished by the mass lengthening in one direction, and then the whole mass flowing into the process, and thus the cell changes position.

Its nutritive power is manifested through this prolongation or tentacle seizing the food and drawing it into its mass. Because of those vital or physiological qualities, the white blood-cells have been called by the eminent Russian zoologist, Machinkoff, "phagocytes," or devourers. In the published scientific literature of the day concerning those cells, they have been called eating cells, wandering cells, chimney-sweeps of the blood, etc.,—names indicating that, in a way peculiar to themselves, they assist in purifying the blood, having the ability to seize upon the waste products of the system.

It is also supposed the phagocytes prey upon the small foreign bodies in the blood, organic or inorganic, dead or living, including diseased germs and all invading bacteria.

The plausibility of Mechinkoff's phagocytic theory and its acceptance by some of the known morphologists of the world has suggested that perhaps some of the mysterious phenomena observed in the treatment of disease by the dental practitioner might be explained by the drawing function of the leucocytes.

In the January number of the *Buffalo Dental Journal*, Dr. Frank W. Low has given us an interesting paper entitled "Phagocytosis." Following an explanation of the theory he says, "In the existence of the phagocytes we have an intelligent explanation of the successful outcome of much of the careless root-work which is undoubtedly being done the whole country over."

He believes that teeth, if treated with dry, hot air and mechanical cleansing, as practised by some operators, speedily assume healthy relations with the surrounding tissues.

The phagocyte cells act as factors in devouring all bacteria, both in the pulp-canal and in the tissues about the apex of the roots. Dr. Low ventures the opinion that phagocytes may penetrate the dental tubuli of the root from the pulp-canal. It is doubtful if the smallest blood corpuscle, average size $\frac{1}{2500}$ inch, could enter those tubuli, especially if the root-canal is surrounded with a dense layer of dentine, as recently described by Professor Miller.

If the dental pulp is invaded by putrefactive micro-organisms, through a point of exposure, or by way of the vessels entering the pulp through the foramen, those wandering cells may and probably do enter with the blood supplied to the pulp.

Dr. Low believes that when stasis is complete, the battle goes against the phagocytes, because reinforcements cannot come to the rescue, while the bacteria proliferate without hinderance in the dead pulp-tissue.

Pulp sometimes dies from injury in teeth, the crowns of which are sound. In those cases the pulp may or may not become putrefactive. In those cases in which the pulp atrophies or remains moist and, as we say, sweet, it may be assumed that the bacteria circulating in the blood and brought to the injured tissues at the apical space have not entered the pulp.

In cases in which the injury has been severe, and inflammation confined more nearly about the apex of the root, we are less likely to have a putrefactive pulp and dentinal abscess. The severe injury is followed by prompt and decided inflammatory reaction, in which the leucocytes pass out freely into the inflamed area and readily devour the pyogenic cocci always present in the damaged tissue.

Dr. Low gives the details of several bacteriological experiments with teeth containing putrefactive pulps, and concludes: "But one inference can be drawn from the results observed,—that the phagocytic cells act as the factors of alimentation in devouring all bacteria in the pulp-canal and the tissues about the apex of the root."

The cause of the disease known as pyorrhœa alveolaris has not yet been determined. It is, however, generally agreed that pathogenic bacteria are always present in the disease. As a means of cure, very much has been claimed for the heroic surgical treatment, as practised by the late Dr. Riggs, and others since his day. How the injury to the tissues resulting from this mode of treatment exercises a curative effect has been an enigma. May it not be naturally explained by the phagocytic action of the leucocytes which crowd in when the fibrinous degree of inflammation following tissual injury is reached? The bacteria always present, both specific and non-specific, are devoured, and naturally the inflammatory process ends with the formation of new or cicatricial tissue. Then it is said you have a cure.

If pyorrhœa is caused by a micro-organism, and is an infectious disease, we have here an instance where the inflammation, excited by a particular microbe, becomes, through the medium of leucocytes, the cause of its own destruction.

We have been taught to place great reliance upon the so-called vital-resisting powers of the tissues. No doubt the living tissues exert a great influence in checking the development of bacteria in the diseased conditions I have mentioned, as well as in many others we are called upon to treat; but it is only when we fully recognize the phagocytic action of the white blood corpuscles that much which is obscure in treatment is rendered comprehensible.

However, a belief in phagocytosis should not lead us to relax in the least the application of the most thorough antiseptic methods in our daily practice. The study of antiseptics and the intelligent use of antiseptic agents has done more than all else to cause dentistry to be classed as an art.

Antisepsis and phagocytosis, then, are both important factors in the treatment and cure of all germ-diseases, and should both alike receive our careful attention.

DISCUSSION.

Dr. Rhein.—The paper as read by Dr. Patterson, in going over the forms of disease of the mucous membrane and describing the

various methods by which diseases of this membrane are brought about, was very interesting, and I, for my part, have no doubt that such cases are frequently met with; but in all they are bound to yield very readily to treatment. They are simply localized disturbances, and ought not to bring much difficulty to the practitioner, if they are properly diagnosed. But here is where I draw the line. I think, and have always thought, that Dr. Patterson's view in regard to the disease that is called *pyorrhœa alveolaris* is that he does not take the proper view of the important part constitutional disturbances play in the cases of this kind that come under our notice.

After a careful hearing of his paper, the effect that was left upon me was that it was a very simple matter, and that all of these forms ought to yield readily to treatment. They do not do so, and it is almost imperative that we find some other factor as their cause. I differ with him on one point, and that is, that in the inception of this trouble we find an increased activity in the parts.

In the observations I have made, I found exactly the opposite condition. I have found that there is a decided stasis in the blood-supply, and that is where I believe we must look to find the real secret of the origin. If he is correct in his assertion that there is an increased activity (there may be in some of the forms), the rest of his assertions could possibly follow; but if he is wrong at the outset, and there is no increased activity, but, on the contrary, there is a diminished activity, why the whole fabric of his argument falls to the ground.

With the remarks which he made that we generally find these forms of disease in every climate and under all conditions, I agree, and it bears out the line of reasoning that I would like to pursue,—that it is due entirely to a perverted function of the general system, manifesting itself locally in these parts.

He dwells particularly on that point, and it supports the fact which I would bring up in contradistinction to his arguments. It is very difficult to argue on this matter without taking in both of these papers.

The last paper was very admirable, as far as it bore on this subject, and I think tends to sustain the line of argument that I am following.

One of the points that Dr. Smith offered was in regard to the results that are so often claimed for the violent treatment as originally demonstrated by Dr. Riggs. I think we all know from experience, and from what we have seen, that there is no question

that very beneficial results have followed from this course of treatment. This was mechanical, extending to the roots, and the theory to be advanced as to the reason why this may be beneficial is the fact that it goes deep enough to strike all the tissue that is in that condition of inactivity, and the stimulation which follows from this violent action brings about increased activity to the parts that we can see in the operation of implantation, when it is performed.

It is following the same line of increased activity, as long as you produce sufficient irritation. I believe that the time ought to be near at hand when we should get a better name for this type of trouble that we meet so frequently. There are so many varied forms of purulent discharges that arise from dissimilar causes that it is almost impossible to discuss this subject without leaving a place open for some one to really give actual cases in practice that are exactly different from any line of reasoning that a speaker cares to take in the discussion of this subject, showing the fact that any disturbance of the functional activity can produce this trouble.

There are a great many cases of nothing more than alveolar abscesses that are often confounded with pyorrhœa alveolaris, and are treated for that without ever looking to the real source of the trouble. I believe that a large majority of cases are constantly treated for pyorrhœa where the pulp of the tooth is simply dead and this death of the pulp has not been properly diagnosticated.

I offer this suggestion because I have found in a very large percentage of cases that no one would suspect the pulp of not being in a good, healthy condition,—where there was no external abrasion of the teeth, where the teeth were to all appearances sound, where they did not show any opacity,—yet, on a more careful examination of it, the pulp in those teeth would be found to be dead. In some, irritation resulting from the death of the pulp was sufficient to cause the conditions we find in pyorrhœa alveolaris.

Granting such a condition of affairs to exist, we all know that radical treatment necessitates the removing of the *débris* in the tooth. I throw out this suggestion for the members, because I believe very few men in practice have an idea of the number of lesions of this character that exist, and the question is almost entirely ignored in making a diagnosis, because of the normal appearance of the teeth.

Dr. Barrett.—It is not every day that we can have so many papers of such great interest and value presented to the Associa-

tion, and have them listened to with so much patience as we have witnessed this morning.

The first paper that is now under discussion is of very great interest, but I have nothing special to say upon that, other than to congratulate the Association upon having the opportunity to listen to it.

It has long been a problem in human physiology as to the leucocytes of the blood. What their peculiar office is has not been determined. What has been their mission is not known, but physiologists know that they were not created in vain. It is extremely probable that the theory which has been advanced and was urged last summer in Berlin is true. Professor Lister there read a paper before the International Medical Congress which is of great interest. In it he took occasion to recede from the ground he took nine years before, and to declare that in his opinion an entire aseptic condition could not be secured as long as there was the existence of bacteria in the blood; but we know that one who is in ordinary health is generally in immunity from those diseases, that the system seems to be proof against this infection. How can it be?

In other conditions we find that this is not the case. There must be something or other that shall act to protect the system. We know that as we stand and sit here that microbes, pathogenic and non-pathogenic, are in the air. How is it that we are not inoculated with them? How is it that the bacteria do not find lodgement in the human system? Why does it not produce these effects? There must be some means of protecting the system.

It is extremely probable, although I do not believe that it is established as a scientific fact, yet it is probable that this exists.

The leucocytes are in a mass of jelly-like consistency that seems about to melt. It has been observed that certain organisms have been seen within the body of an amœboid cell, especially in the rod-like bacteria. It envelops itself about the bacteria, and you find the rod projecting at both ends,—the rod-like bacteria projecting at each end from the body of the amœboid cell, while digestion was going on within the body. As this becomes digested the ends have dropped off and been lost, while the central portion was absolutely absorbed.

An amœboid cell may digest organic matter of this kind simply by enveloping it. That is the method when the blood is in a proper condition, that they will envelop it and digest it, and so destroy and limit the spread of the bacteria.

Here is an experiment that was performed recently. You know

the frog is not subject to inoculation for anthrax; but anthrax spores have been enveloped within the pith of a piece of elder, and introduced between the epidermis of the frog. What does that mean? It means that the leucocytes cannot penetrate the pith, but that the serum of the blood can do so. What was the result? The leucocytes being excluded, the disease continued; but the moment the spores reached the surface and the leucocytes could obtain access, a change occurred, and they were absorbed and destroyed. The experiment seems to be almost conclusive.

Dr. Cravens.—It is a pleasure to me to discover that the gentlemen are struggling to explain this subject. It is a pleasure to know that in doing so they have been in a measure successful.

If success has attended immediate root-filling, it certainly requires no ability. I presume that all practitioners would gladly welcome the phagocytes as elements of success. Some gentlemen first denied that immediate root-filling was possible. Now they have discovered why it has been successful, and they immediately take away from those who advocated and practised that method all the credit of it, and say that in spite of our bad manipulation, through the assistance of the phagocytes, the operation of immediate root-filling has been successful.

Dr. Waters, of Boston.—The author of the first paper agreed with me in his experience that all these lesions arising from micro-organisms were preceded by a disturbed condition of the mucous membrane, and that state he ascribed to certain other disturbances.

When a child is born, the surface of the body is pink. It requires a change of conditions and also of the atmosphere to alter the color of the skin and make it pale, and in proportion to that paleness is the health of the child. So long as the skin remains pink and warm the child continues to be healthy. When the skin bleaches, then catarrhal symptoms are present with liability to the development of micro-organisms. If the child lives so as to be able to go to school, a glance of the master's eye will sometimes increase the circulation.

Atmospheric as well as mental conditions have their influence too. I find our east winds, charged with the moisture of the ocean, have a depressing influence upon the functions of the skin, to cause the contraction and disturbance in its action. When we have these antagonisms the pores of the body are closed. What becomes of the carbonic acid that is generated? It is contained in the body, but not in the form of carbonic acid. It unites with the other acids of the blood; it is associated with albumen. When carbonic acid is

united with soda it passes from the body through the kidneys. When you get below a proper amount of alkalinity in the blood you have then the condition which the essayist speaks of in his paper, and not until then. It may be local. No case of consumption ever existed that did not have for its inception a disturbance of the functions of the skin, or possibly, I might say, some external influence which reacted upon the skin and produced derangement.

Dr. Leroy.—I would like to ask some gentleman in the room whether pyorrhœa alveolaris affects devitalized teeth? My attention has been directed to the same.

Dr. Rhein.—I would say that the worst case of so-called pyorrhœa of the teeth, where there was a permanent discharge, that I ever saw was where the pulps were devitalized.

Dr. Morgan.—Whenever the periosteal tissue is destroyed, you have the destruction of the tooth, which produces alveolar abscesses.

Dr. Crawford.—I doubt very seriously whether a genuine case of pyorrhœa alveolaris has ever developed upon a tooth or the tissues in which a tooth is located after the death of the nerve. I have made some observations on that line, but have not reduced them to proper order to be presented. I have had some cases cited to me in opposition to that theory, but I have invariably found this condition to exist.

Dr. Patterson.—I would like to state, in answer to the gentleman who spoke first, that I have never at any time doubted but that constitutional environments must be taken into account in considering diseases of the mucous membrane. I did not give much attention to that in my paper, because that was not my point. This was to direct attention to what was the incipient cause in obscure irritations of mucous membranes which resulted in diseases. I do not doubt that a large number of the lesions of the mucous membrane can be ascribed to constitutional causes. Dr. Rhein was in error in one remark he made. He stated that I said that there was increased nutrition after function was destroyed. So there is. It is the same in all cases of inflammation. Then comes the stasis which he referred to, and the loss of nutrition, but after irritation there is loss of function, then a stoppage of circulation, after which we see increased diffusion and discharges, and all the stages of inflammation. That is all I have to say on the question.

Dr. Smith.—I have already occupied too much time for the section, and as chairman I wish to thank the association for their attention to its protracted discussion.

Report of Section VII., "Anatomy, Pathology, and Surgery," was presented by Dr. T. W. Brophy, chairman.

The following paper was read by Dr. Barrett, of Buffalo:

A PLEA FOR CONSERVATISM.

BY DR. W. C. BARRETT, BUFFALO.

It seems to me time that we began to consider the subject of antiseptic dental treatment from a more rational stand-point. Microbes cannot be utterly excluded from the mouth. They will penetrate cavities of decay despite the greatest precautions. Utter asepticism in any portion of the human system is a dream that has no foundation in fact. At the International Medical Congress in London, in 1881, Sir Joseph Lister, who has given his name to a method of operative procedure, announced that the horrors of surgical interference were abolished, and that by means of the carbolic spray it was possible to operate under entirely aseptic conditions. But Ziegler and Bantock and Tait scored even greater successes than did Lister. They spurned his spray, being only sedulously careful as to cleanliness and irrigation.

At the Congress held in Berlin last summer, we who had listened to Professor Lister with so much suppressed emotion only nine years before, were astounded to hear him now say, "As regards the spray, I feel ashamed that I should ever have recommended it for the purpose of destroying the microbes of the air."

The practice recommended by some of our most intelligent dentists in the treatment of root-canals, it seems to me, looks towards the entire exclusion of microbes. Everything is managed with this end in view. The utmost stress is laid upon the most minute parts, while other needed precautions are neglected. In cases of alveolar abscesses, we hear of nothing save detergents and antiseptics. It seems to be taken for granted that the microbe can be exterminated. Nothing else need be done. In the capping of exposed pulps, asepticism is made the only condition of success.

I wish again to say that I am not urging indifference to antiseptic treatment. I believe it to be absolutely essential to successful practice; but I do not think that it is the sole factor and the only thing to be looked after. I do not believe that the entire absence of all organism can ever be assured. I do not hold it possible to secure a complete aseptic condition by any external means or agent. We cannot control the processes of nature. We can only

influence them to a certain degree. We cannot, for instance, furnish the proximate principles of the body from without. We can only supply the proper pabulum, and from that allow the nutritive system to select and prepare its own material. The attempt to harden the bones of the body by giving phosphate of lime is a hopeless task, and it is quite as much so to undertake the extermination from the tissues and organs of the body of all the micro-organisms, either of pathogenic or non-pathogenic nature.

The oral cavity is never without microbes of various kinds. The multiplication of remedy and the duplication and reduplication of methods will not compass the impossible. The more complicated the processes employed, the greater the opportunity for error. The entire sterilization of dental instruments is impracticable. We may approximate it, but it is hopeless to attempt to destroy all spores without ruining the instrument. The germs of different fungi are too numerous and too widely diffused to be entirely destroyed. Wherever air enters, there goes the possibility of infection, and air cannot be utterly excluded. Within the tissues, diffused throughout the blood, penetrating everywhere, the spores of the fungi are found in health as well as in disease. There is no immunity from infection when an organ or tissue shall ever have taken on a condition of atony. The microbe has all lands for his own, and it is useless to attempt to fly from his presence.

Does this absolve us from all attempt at asepticism? By no means. The very fact of the universality of the microbe should stimulate us to greater precaution. That instruments may not be absolutely sterile is no excuse for the almost universal and criminal neglect of proper precaution.

How many operators keep a sterilizing apparatus and faithfully use it? It is of no material use merely to dip a point into some solution and then call it sterilized. How many have a special apparatus for the purpose? And yet no man should be permitted to practise without something of the kind.

While we cannot utterly banish micro-organisms, we have no right to be inoculating with specific pathogenic bacteria. I have seen many cases in which a previously healthy mouth became diseased after the filling of a tooth by the carelessness of some ignorant dentist.

In a condition of entire health, nature has made provision for the entire destruction of invading bacteria. Whether the theory of Metchnikoff be true, and the peculiar power to digest and devour them rests in the leucocytes of the blood, or whether microbicidal

action can be found in some other function, we cannot positively state; but we do know that until the tone of the system be in some way depressed, there is immunity from the usual pathogenic organism.

That the spores of different species vary in virulence is, of course, a fact; but it does not affect the truth of the principle. A tooth that has lost its pulp cannot be said to be in a normal condition; yet in the healthy mouth, if proper precautions have been taken, and if the right mechanical manner for its protection shall have been employed, we know that it is secure against the attack of disease under ordinary circumstances. We know that in many instances a pulp has been destroyed in the most slovenly way imaginable, without any regard even for decent cleanliness, and fillings have been inserted over devitalized pulps without even an attempt to remove the contents of the root-canal, and it has remained in apparent good condition for years.

We know that until within a comparatively short time the roots of teeth were filled without antiseptic precautions, because the condition was not then comprehended, and yet they were sometimes well saved. Westcott and Dwinelle, and their compeers, filled nerve-canals before microbes and antiseptics were dreamed of, and they did it with success too. Antiseptic treatment is not, then, always an essential; but Westcott and Dwinelle were not able to save as large a number of cases, nor were they, with their incomplete comprehension of pathology which belonged to the fifth and sixth decades of the century, warranted in attempting the salvation of a class of teeth which, in the light of the further knowledge of this tenth decade, we do not hesitate to fill.

I care little for coagulants or non-coagulants. Coagulation is certain in albumen when exposed to external agencies, and all the non-coagulants in the world cannot prevent it, except by its practical destruction. I care not to exclude all organisms, for I know that to be impossible. There are many which are not pathogenic in their character. It is idle to talk of danger from amoebæic, deep-seated organisms, for they are usually harmless, and if they were not, they could not be avoided. I care not that every instrument that enters the pulp-chamber shall have been heated to a red heat, which is the only way completely to secure sterilization. We know that the material with which the root is filled is never made sterile, and if the manipulation is what it should be there is no necessity for it. We know that utter asepticism of the mouth is a hopeless dream, even if it were desirable; but we also know that cleanliness

and dryness are essential, and we know that these are within the reach of every careful operator. We know, too, that comparative freedom from pathogenic microbes is readily attainable, and the dentist who does not secure this is unworthy the name. We know that a state of asepticism is not the only one upon which the health of the tissues depends, and it is quite as excusable to neglect one necessary precaution as another.

So I again protest against the tone of some of our modern teachings that seems to ignore all that is not new and unheard-of by the average dentist, and that affects the obscure and the occult. I am willing to sacrifice my reputation for scholarship to that of good sense. I would rather have the approval of those who are really intelligent than the applause of any number of groundlings.

If I can be known as a safe, reliable, conservative, level-headed practitioner, I will resign all claims to daring, experimental, brilliant empiricism. I recognize the fact that it is necessary that there should be innovations and innovators, but I do not desire to be the patient of one. I honor those who by patient, laborious investigations elucidate the incontestable truths of science, but I cannot give my approbation to him who catches up the half of an idea, and by an absurd extravagance manages to taint even the best cause. Therefore, while I eagerly seize upon new truths, I will try to prove all things, and especially to hold fast to that which is good.

Adjourned.

Editorial.

WHERE SHOULD PAPERS BE PUBLISHED?

THE impression has gone abroad in the dental profession that, while it is numerically strong, it is lamentably lacking in intellectual and financial strength, and needs the help of the large business interests to enable it to advance. The time has come when dentists should not only be inspired with other views, but should refrain from all expressions that seem to lack faith, not in its ultimate possibilities, but in the position already attained.

We were impressed with the remarks made at the New York Odontological Society in June last, and published in the October number of this journal, and especially with those made by one

gentleman present. The statement exhibited a condition of mental antagonism not at all creditable to the individual quoted by the speaker. In order that the subject may be understood, we give a portion of Dr. Bogue's remarks in reply to Dr. Meriam. After some preliminaries he stated :

"In making application as one of the members of your executive committee to a gentleman for a paper to be read before this Society, I was met with almost a prompt refusal, on the ground that papers read here would not be published in the *Dental Cosmos*. I undertook to argue the gentleman out of his decision, but was met by the *strong argument* that the *Dental Cosmos* had attained a position that made it the most *widely read of all the dental journals*; if he had taken the trouble to get up a good article he wished it to be read as widely as possible. . . . Now comes the question, Are we sufficiently strong to fight our own battles? Are we yet able to take the position as an independent profession, . . . casting aside personal self-interests and laboring for the good of others?" [Italics ours.]

The reasoning that would lead to the refusal of a paper on such grounds must be very defective. It is unquestionably true that to publish an article in certain dental periodicals, intended solely for advertisement, would be destructive, and result in burying the paper beyond all hopes of resurrection.

The question to be considered is, Have we in dentistry a large body of readers? Dentistry is physically a very trying profession, perhaps more so than any other. Very few persons after standing all day over the chair, subjected to the nervous anxieties of patients, are equal to spending their evenings in reading, much less in study. Besides this, it is well known that full practice means constant extra hours of labor, oftentimes far into the night, to keep up with the increasing demands of the clientele. This overtaxing work inevitably decreases the number of readers, and has also had the effect of limiting the number of those willing to write for societies and journals.

This being the fact, and it is indisputable, it naturally follows that those who will care to take professional journals must be confined to three classes,—

1. Those who desire to keep themselves fully abreast with the progress of scientific development, and who will endeavor to read everything as it appears, not only in one, but in several journals.

2. Those who take a journal to skim over its contents for any practical ideas, and give the advertising pages special attention for the same reason.

3. Those who take one journal solely for the advertisements.

It is probably true that of the fifteen thousand dentists in the United States, not more than forty per cent., or six thousand, judging by subscription-lists, take any journal regularly. Exactly how many may be classed under each of the three arbitrary divisions made it would be difficult to determine; but it is very safe to assume that one-half of the six thousand belong to the third class, who take a journal for its advertisements, while the balance may again be equally divided between the readers and those who seek only for practical ideas. This calculation reduces the leading journals to a common basis. Those which meet the higher wants of the first class will be taken and read, and it is immaterial whether the circulation be much or little, the result is the same as far as the distribution of ideas is concerned. If any doubt these conclusions, take any twenty dentists and interrogate them as to the contents of certain journals. The result, we think, will amply justify the statement made that dentists are not, regarded as a whole, devoted readers of their own literature.

If these conclusions be admitted, the person who habitually gives his productions to the journal supposed to have the largest circulation may not be making a mistake in so doing, if he wishes to have his article spread over the greatest number of pages; but he errs most decidedly if he supposes he will secure an increased number of readers.

That journal is the best and the surest medium for original thought which bases its reputation on the highest standard attainable, and which meets the needs of the most cultivated class in the profession.

The labor to sustain such journals is one worthy of our highest endeavor. It must be above selfish motives. It must recognize the fact that in such periodicals nothing is lost. They are the ones preserved, and eventually they become centres of reference. Libraries gladly receive them, and they develop in the largest sense not only the instructors of the present generation, but those which are to follow.

The remarks made at that meeting were unintentionally, we are disposed to believe, aimed at this journal. To disparage such an effort as the *INTERNATIONAL DENTAL JOURNAL* represents by bringing it in comparison with a journal of supposed larger circulation, may be interesting in a discussion, but is not the way, as we view it, to enlarge the sphere of professional usefulness. We are interested most in the fact that the journal alluded to, the *INTERNATIONAL DENTAL JOURNAL*, and all others of the character

described, will be read equally, and their articles will be copied in proportion to their intrinsic value. In proof of this it may be stated that many of the papers published in this journal have been extensively republished abroad, and the subject-matter of several has elicited wide discussion. This has enlarged the circle of readers of some of the most valuable scientific articles published in the present volume.

The battle then can be, *must be*, fought within our own lines. Without vigorous and persistent effort no advance can be made. Opposition and contest means increased strength, and without it all effort becomes, in the end, weak and vacillating.

THE CLOSING OF THE YEAR.

THE present number closes the twelfth volume of this journal, and before another issue the year will have left its record for 1891.

The past twelve months have been fruitful with progress, not perhaps visible to the casual observer, but clearly indicated to those who measure advances by the silent but deep undercurrent of active thought.

Professional education in dentistry received its earliest impulse in the past, but its progress has been so slow as to be almost discouraging. It was reserved for 1891 to show that the marked advance in educational work, so long contemplated, was not productive of the serious upheaval it was supposed would result; but has added stability to the colleges. That while these will, doubtless, have diminished incomes, the change has been accomplished with less friction than was anticipated, while at the same time the expansion of professional culture by the movement promises to be beyond the calculations of the most experienced.

The same inspiring influence that led to the adoption of a higher standard in college training has also led to dissatisfaction with methods in the associations. The spirit of unrest, seeking to discard old ideas not adapted to the change in modern thought, has prevailed, and is asserting itself with a positive power in these organizations. This is the silent effect of a higher education culminating in active efforts for improvement.

There has been also an observed advance in the practical branches. Mechanical, or, as some prefer to call it, prosthetic, dentistry has resumed its proper place from which it was dethroned

by the plastic bases, and promises to take a position as a specialty in dentistry. This tendency to segregation has developed rapidly within the past year. It may seem singular to some of the older workers to have the statement made that dentistry to-day is growing too full for one man to successfully master, but it is nevertheless true and must be obvious to all careful observers. It is rapidly dividing into oral surgeons, administrators of anæsthetics, operative and mechanical dentists, and bridge and continuous-gum workers. The one person who attempts all of these will find himself a lamentable failure. The past twelve months have exhibited a marked impulse towards this silent "parting of the ways," and the indications are that specialism will be a still more marked feature of dentistry in succeeding years.

The progress of dental literature has kept pace with the mental activity in other directions. The year has given to dentistry valuable publications, and has shown an advance in periodical work. This promises to be still more apparent in the near future.

The INTERNATIONAL DENTAL JOURNAL has, we think, shared in the general upward impulse. The retrospect of this work affords gratification, in that it is felt that the high standard set for its government has been maintained, and that the matter published has been of a positive scientific value, and indicates that undercurrent to which we before alluded. It is anticipated that still greater results will be apparent now that it has happily developed beyond the experimental stage.

The close of the year, therefore, offers every encouragement for renewed energy and enlarged aspirations. We have no fear that the influence of the past will be lost. The impetus has been given slowly, silently, but surely, and we are confident that a constantly- and ever-increasing development will show marked results for the New Year.

ASSISTANT EDITOR.

WE have the pleasure of announcing that Joseph Head, M.D., D.D.S., has accepted the position of Assistant Editor of the INTERNATIONAL DENTAL JOURNAL, and will assume the duties in the January number. Dr. Head is well known in Eastern dental circles, and we feel that his wide experience in professional and literary work will add additional strength to the journal, and relieve the pressure of editorial responsibility.

Bibliography.

THE POCKET MATERIA MEDICA AND THERAPEUTICS. By C. HENRI LEONARD, A.M., M.D. The Illustrated Medical Journal Co., Detroit, Mich., 1891.

This book, "designed for the practitioner as much as for the student," has been compiled with much care. "The newer remedies are not to be found in the dispensaries, pharmacopœias, or standard works upon materia medica," hence it combines much valuable matter not obtainable except by laborious search through various sources of information.

It will be found a convenient volume for the physician, student, or druggist.

DENTAL MEDICINE: A MANUAL OF DENTAL MATERIA MEDICA AND THERAPEUTICS. By FERDINAND J. S. GORGAS, M.D., D.D.S. Fourth Edition, Revised and Enlarged. P. Blakiston, Son & Co. Philadelphia, 1891.

This standard work of dental materia medica has been in such demand that each edition has become exhausted before the completion of that succeeding. This rapid sale is indicative of the appreciation felt for it in college circles. It has met a want as a textbook, and has become a necessity to the dental student and to the practitioner who wishes to keep himself informed without the labor of examination of larger and more original works. Much new matter has been added, bringing the book to five hundred and twenty-four pages. Condensation will be required in future editions, as this has already reached the limit of a convenient textbook.

In addition to matter on various subjects, the following list of "new antiseptics, disinfectants, germicides, hypnotics, etc., will be found fully considered: Aristol, bromol, campho-phenique, phenol-camphor, chloralamide, synthetic carbolic acid, biniodide of mercury, iodine, trichloride, chloral-phenol, iodo-phenacetin, lysol, bichloride of methylene, microcidine, myrtol, phenacetin, pyoktanin, salol, sodium, silico-fluoride, salipyrene, etc.

The opening of a work of this kind, with fifty-six pages descriptive of pathological conditions, seems altogether inappropriate. While this matter has a value apart from its present connections, it

might be omitted in future editions without detriment to the main subject.

The author continues the paragraph in regard to the application of arsenic on sensitive dentine, notwithstanding repeated criticisms made on the former editions. He writes: "As it (arsenic) is capable of being absorbed through a considerable thickness of dentine, the result of which would be the death of the pulp, arsenious acid, if it is employed for obtunding the sensibility of the dentine, *should be suffered to remain in the tooth but a very short time,—from one to three hours,—and every particle of it carefully removed.*" (Italics ours.)

Three hours would be amply sufficient to carry the destructive process beyond reparation. Exactly how *every particle of arsenious acid* is to be removed after three hours is not explained.

The habit of this writer still is evident of appropriating freely from the original work of others and weaving it in the text. Criticism has stimulated to a show of fairness in this direction, but there is still much room for improvement. The ordinary facts in *materia medica* are generally public property, but even here there is a limit to appropriation without credit; but when dental matters of a practical bearing are considered, care should be taken to designate the originator of a special process.

The attention of the author is called to page 163, to bad proof-reading. There is no such person as Charles Truman, nor did such an individual write on iodoform and arsenic as a "painless devitalizer under all conditions." The article in question was written by James Truman.

The author has been assiduous in his efforts to bring into book form all the agents of any value in *materia medica* recently introduced. The dental student will, therefore, find nothing lacking to aid him in the study of this rapidly-growing subject.

ANNUAL OF THE UNIVERSAL MEDICAL SCIENCES: A YEARLY REPORT OF THE PROGRESS OF THE GENERAL SANITARY SCIENCES THROUGHOUT THE WORLD. Edited by CHARLES E. SAJOUS, M.D., and Seventy Associate Editors. Illustrated with Chromo-Lithographs, Engravings, and Maps. F. A. Davis, Publisher. Philadelphia, New York, Chicago, Atlanta, and London, 1891.

This well-known publication, edited by Dr. Sajous and his associates, is again presented to the medical world in five volumes.

This unique work has been completed for 1891 most satisfactorily and under many difficulties. It is questionable whether any

but those directly engaged can fully appreciate the gigantic character of this undertaking,—sufficient to appall any ordinary man; but the editor-in-chief is not an ordinary worker, as the volumes published abundantly prove.

The list of associate editors accompanying each volume is a guarantee as to the thoroughness of preparation of each department, making it truly a universal synopsis of medical progress during the year throughout the world. To this is added a full index and reference list of publications quoted, to which page and date are supplied in the text. This is a valuable addition.

This is a period in the history of labor when the world's knowledge requires condensation. The progressive mind in all departments of culture is so active that the average man cannot keep pace with it, much less can he afford the time to search for the facts so necessary in practice, and which are required to render him intelligent on all subjects. If this be true of mankind in general it has special application to the medical and dental practitioner. It was, therefore, eminently proper that America should produce this publication, as it is here more than anywhere else that concentration finds its greatest necessity. These volumes fulfil this requirement most satisfactorily.

It is to be regretted that dental science finds no place in this publication. This is recognized as no fault of the editor, as every effort was made to secure co-operation of the dental profession in this direction.

If they are not represented in its pages, they should, at least, estimate the great value of the labors of those who have done this work by adding it to their libraries, year by year, as it appears laden with the fresh fruits of the busy brains and hands of investigators in medical science everywhere.

A COMPEND OF HUMAN PHYSIOLOGY, ESPECIALLY ADAPTED FOR THE USE OF MEDICAL STUDENTS. By ALBERT P. BRUBAKER, A.M., M.D. Sixth Edition, Revised and Improved. P. Blakiston, Son & Co. Philadelphia, 1891.

The Quiz Compendis issued by this firm have a positive value as books of reference, and this by Dr. Brubaker is no exception. The fact that it is in its sixth edition is proof sufficient that it has been appreciated by those for whom it was intended.

Condensation is an art not always attained by those who wish to impart information. To express ideas in words which will convey the entire subject, omitting nothing of vital importance, is dif-

fault. In this Dr. Brubaker excels, and his compend not only covers the information demanded for the student but it can be read with interest by those more advanced.

THREE THOUSAND QUESTIONS ON MEDICAL SUBJECTS, ARRANGED FOR SELF-EXAMINATION. P. Blakiston, Son & Co. Philadelphia, 1891.

This little book, prepared for medical students evidently by a teacher of experience, has a positive value. Every student is familiar with the fact that a self-examination involving constant repetitions is the only means to impress any subject upon the individual, but this is not always possible without outside aid.

A correct system of reference is adopted by which the "student with the least expenditure of time can look up the subject and thus doubly fasten it firmly on the mind." As an aid to study, this convenient book can be recommended without any reservations.

THE VEST-POCKET ANATOMIST. (Founded upon Gray.) By C. HENRI LEONARD, A.M., M.D. Fourteenth Revised Edition. The Illustrated Medical Journal Co., Detroit, 1891.

This well-known compend, and, as its name implies, no larger than can be conveniently carried in the pocket,—not the vest-pocket, however,—is presented again in another edition to professional readers.

As it is founded on Gray, with one hundred and ninety-three illustrations, it becomes a convenient book of reference to students; and while it does not exclude or replace the larger work, it will be found a most excellent substitute, and one always in place to refresh the memory or to direct dissection.

Obituary.

AMERICAN DENTAL ASSOCIATION.

IN MEMORIAM.

DR. W. H. ATKINSON.—In the providence of an All-Wise and Overruling Father the subject of this tribute was removed from this to a higher life at his home in New York, April 2, 1891.

It is eminently proper that there should be placed upon the

records of this Association some evidence of the esteem and appreciation entertained by the members of this body for Dr. Atkinson.

He was one of the founders of this Association, and none labored with a more persevering industry than he for its permanent establishment and enduring welfare. He was always present at its meetings, and ever ready with a hearty willingness to fulfil any duty or perform any work assigned to him; he doubtless exercised a deeper and broader impress upon it than any other member; he was always the advocate of a broad and liberal policy, impatient with the low, narrow, and selfish. He possessed strong convictions, and was ever ready to avow and defend them; mere antagonism added strength to his forceful nature; notwithstanding this, he would yield with child-like simplicity to evidence and reason when properly presented.

He was not only interested here, but in association work everywhere, and gave aid and co-operation in the organization and maintenance of dental societies throughout this country. He was enthusiastic in the formation of dental and scientific societies, throwing his whole energy, whenever opportunity offered, into such enterprises.

He was also greatly interested in the subject of dental education, ever ready to give wise counsel and aid whenever it was in his power and wherever needed.

By his enthusiasm he awakened interest and stimulated thought wherever he went; indeed, his presence was an inspiration. He exercised an almost unparalleled influence in the profession, and that, too, in the way of aiding and making better professionally those who came within its sphere; this he did at home, in his office, and abroad. He was the first to promulgate many new points in practice; he never hesitated to put forth anything that he thought would be of service to others; he communicated freely all he had. He possessed a wonderful faculty for communicating knowledge to others, as was shown in the fact that for years he had private classes that came to his office at stated times, and sat under his instruction, and such was his power in this work, that he was able to communicate not only of his knowledge, but of his enthusiasm as well, to those who were his pupils. Everything he did and every resource he possessed were made subservient to his ambition for the advancement of dental science and art.

He had a broad, generous, and sympathetic nature, with a heart large enough for the reception of all who had any just claim upon the regard and esteem of our common humanity. He was a

firm and abiding friend, sympathetic, kind, and always ready to aid those in trouble.

And now, in view of this great loss,—

Resolved, That we will ever cherish, and will seek to perpetuate, the memory of our departed brother whose demise we so sadly mourn to-day; that we will not only cherish it ourselves, but will seek to bear it on to those who come after.

Resolved, That in all the traits of this grand character as above delineated, there is an example to which we can with profit conform; and especially may the younger and the coming members of the profession be directed to this great exemplar.

Resolved, That this tribute of regard and affection be spread on a memorial page of the transactions of this body.

Resolved, That a copy, properly prepared, be sent to the family of the deceased.

Resolved, That a copy be sent to the dental journals of this and other countries for publication.

J. TAFT.

GEO. W. McELHANEY.

L. JACK.

F. ABBOTT.

EUGENE S. TALBOT.

Domestic Correspondence.

AMERICAN MEDICAL ASSOCIATION.

[THE following circular-note, addressed to the INTERNATIONAL DENTAL JOURNAL, seemed to require explanation, and we, therefore, sent it to Dr. E. S. Talbot, ex-president of the Section of Dental and Oral Surgery. His letter in reply accompanied it. In a note subsequently received he states that Dr. S. N. Davis, of Chicago, ex-president of the American Medical Association, and "father of the movement," said, "the letter covered the ground, and that he could not add anything to it."—ED.]

PHILADELPHIA, August 14, 1891.

MEMBERSHIP IN THE AMERICAN MEDICAL ASSOCIATION.—This is obtainable, at any time, by a member of any State or local medical society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the treasurer of the Association, Dr. Richard J. Dunglison,

Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own society, signed by the president and secretary of said society, with five dollars for annual dues. Attendance as a delegate at an annual meeting of the Association is not necessary in order to obtain membership. On receipt of the above amount the weekly journal of the Association will be forwarded regularly.

RICHARD J. DUNGLISON, M.D.,
Treasurer.

TO THE EDITOR :

DEAR SIR,—Your letter, asking my opinion in regard to membership in the American Medical Association, is at hand. In reply would say that there has never been a clear understanding among dentists in regard to the resolution adopted by the Association in June, 1887. By this resolution (see August number of *INTERNATIONAL DENTAL JOURNAL*, page 517) a person who has graduated from a dental college is recognized as a medical practitioner, and is entitled to membership in the American Medical Association, provided the school in which he graduated "requires of its students a standard of preliminary or general education and a term of professional study," etc. (See resolution.) The person must belong to a medical or dental society which has adopted the Code of Ethics of the American Medical Association. Having complied with these requirements, the D.D.S. is eligible to membership on an equal footing with the M.D. The question now is, What colleges have fulfilled these requirements? Although it is not so stated, it was intended that this resolution should include the graduates of such colleges or schools as Harvard, University of Pennsylvania, Ann Arbor, University of Chicago, and other schools that require of their students attendance upon lectures in medical colleges jointly with medical students, and pass the same examination as medical students in the fundamental sciences of medicine, such as anatomy, physiology, chemistry, pathology, and general surgery, omitting such studies as obstetrics, practical medicine, etc., and taking in their place didactic and clinical teaching in dental surgery. So far an exceedingly liberal construction has been put upon this resolution, but if the resolution remains in force in the Association, it will probably not be long before a line will be drawn so that the graduate of no college except those demanding a thorough knowledge of the fundamental principles of a medical education will be admitted to membership. All that is required, then, is to join a medical society which has adopted the Code of Ethics of the American Medical Association, or have some dental society or club adopt the

code of ethics, and a person becomes eligible to membership according to the circular of Dr. Dunglison.

I cannot understand, when the best medical men in this country throw open the doors of the National Association to the better class of dentists, why they do not avail themselves of the opportunity and become scientists among scientific men. The medical men have met us more than half-way and are glad to welcome us into their meetings.

Very truly yours,

EUGENE S. TALBOT.

CHICAGO, September 28, 1891.

NEW YORK, August 7, 1891.

TO THE EDITOR:

DEAR SIR,—I have noticed that in an editorial in the August number of the *INTERNATIONAL DENTAL JOURNAL*, an attempt is made to establish the date of the introduction into dental practice of the operation termed inlay; that reference is made to a report on Dental Art and Invention made by me to the 1891 meeting of the Illinois State Dental Society, in which inlays were touched upon, and that mention is made of several descriptions of different forms of inlays as appearing in the journals during the latter part of the year previous.

While I am the last person to quibble over the question of priority where it would be so difficult to trace the conception of a method to its original source, I wish to put you in possession of additional data which may help to forestall any complications arising from patents covering the operation.

I was somewhat surprised on reading your editorial that you had not noticed in the transactions of the previous year—viz., 1890—some remarks made by me on the subject of inlays, which remarks were the substance of a paper read before the Odontological Society of Chicago several months previous to the date of the State meeting.

In connection with the gold inlay, with which variety I have had most to do, I can refer you to some matter dating much further than these presentations,—viz., a description in the second edition of Dr. George Evans's "*Crown- and Bridge-Work*" of the method as practised by Dr. H. A. Parr. This, I might say, dated back with Dr. Parr to December, 1888. When in conversation with Drs.

Parr and Evans, while visiting in their city, I described in detail this operation, which I had in a few instances at that time performed.

From what source I first obtained the idea of filling a gold or platinum matrix with gold solder or other materials, I do not attempt to recall, since this method has no doubt evolved step by step from an origin that would be very difficult of discovery. I remember that at the time of the bringing out, about 1887, of the patented platinum and porcelain inlay by C. H. Land, of Detroit, Mich., I did not recognize anything of an especially novel nature except that he used a furnace of novel construction, and some materials the composition of which was kept secret.

I trust that since the Dental Protective Association has become a firmly-established institution, we are in no danger of being harassed by any ambitious person, who might otherwise attempt to monopolize this valuable operation.

I am yours very sincerely,

W. B. AMES, D.D.S.

70 STATE ST., CHICAGO.

[The object of the editorial alluded to was to call the attention of the profession to the importance of carefully noting facts as they are presented, and did not claim to be more than approximately correct. The subject of "Inlays" was introduced with the hope that this important and growing process would be traced to its source by some one with more time than the busy editor of this journal. Perhaps no one is better qualified for this labor than the writer of the letter.—ED.]

A CORRECTION.

TO THE EDITOR:

My attention has been called to the fact that the name of the dental department of the National University of Washington, D. C., does not appear in the list of colleges which the National Association of Dental Examiners recommends to the various State Boards to accept as reputable. In justice to that college I would state that the omission is an error, the correction of which the State Board will please take notice.

FRED. A. LEVY,
Secretary N.A.D.E.

NOVEMBER 12, 1891.

Current News.

MISSOURI STATE DENTAL ASSOCIATION.

THE Twenty-seventh Annual Meeting of the Missouri State Dental Association was held at Louisiana, Mo., July 7 to 10, inclusive. The following officers were elected for 1892: President, Dr. George L. Shepard, Sedalia, Mo.; Vice-President, Dr. E. E. Shattuck, Kansas City, Mo.; Second Vice-President, Dr. J. T. Fry, Moberly, Mo.; Corresponding Secretary, Dr. William Conrad, St. Louis, Mo.; Recording Secretary, Dr. W. M. Carter, Sedalia, Mo.; Treasurer, Dr. J. A. Price, Weston, Mo.

Board of Censors.—Dr. C. J. McBride, Perryville; Dr. W. H. Buckley, Liberty; Dr. C. Lindsley, St. Louis, Mo.

Committee on Ethics.—Dr. F. Slater, Rich Hill; Dr. E. B. Crane, California; Dr. E. W. Bear, Sedalia, Mo.

Publication Committee.—Dr. E. E. Shattuck, Kansas City; Dr. W. S. Lowry, Kansas City; Dr. W. E. Tucker, Springfield, Mo.

Committee on Law.—Dr. J. A. Price, Weston, Mo.

Committee on New Appliances.—Dr. J. B. Vernon, St. Louis.

The next meeting will be held at Clinton, Mo., the first Tuesday after July 4, 1892.

WILLIAM CONRAD,
Corresponding Secretary.

MASSACHUSETTS DENTAL SOCIETY.

THE following were elected officers of the above Society at its last annual meeting, held in Boston, July 9 and 10, 1891:

President, Dr. George F. Eames, Boston. Vice-Presidents, Dr. J. W. Ball, Boston; Dr. W. E. Page, Boston. Secretary, Dr. Edgar O. Kinsman, Cambridge. Treasurer, Dr. Edward Page, Charlestown. Librarian, Dr. Joseph King Knight, Hyde Park.

Executive Committee.—Dr. R. R. Andrews, Dr. Joseph King Knight, Dr. W. E. Boardman, Dr. H. S. Draper, Dr. V. C. Pond.

DR. EDGAR O. KINSMAN,
Secretary.

15 BRATTLE SQUARE, Cambridge, Mass.

MISSISSIPPI VALLEY MEDICAL ASSOCIATION.

The Mississippi Valley Medical Association held its Seventeenth Annual Session at St. Louis, October 14, 15, and 16, 1891, President Dr. C. H. Hughes, of St. Louis, in the chair. The attendance was large, the papers numerous and valuable. Dr. I. N. Love, the incomparable chairman of the Committee of Arrangements, and his able assistants, deserve unstinted praise for their provision of receptions, rides, dinners, suppers, banquets, fine weather, and full moon. Dr. C. A. L. Reed, of Cincinnati, was elected President; Dr. E. S. McKee, of Cincinnati, re-elected Secretary; Dr. C. S. Bond, Richmond, Ind., First Vice-President; Dr. J. H. Stucky, Louisville, Ky., Second Vice-President; Dr. Joseph Ransohoff, Cincinnati, Chairman Committee of Arrangements. Place of meeting, Cincinnati, October, 1892.

INVITATION TO ANNIVERSARY MEETING OF THE
FIRST DISTRICT SOCIETY OF NEW YORK.

THE members of the profession are cordially invited to attend the Twenty-third Anniversary Meeting of the First District Society, to be held at the Academy of Medicine, No. 17 West Forty-third Street, New York City, January 18, 19, and 20, 1892.

This meeting will be one of prime interest, and a large attendance is confidently expected. The essays to be read will be in the hands of the committee, in advance, and copies will be supplied to those who have kindly promised to discuss the topics. About thirty eminent men will thus be upon our programme, prepared in advance, to take part in the proceedings, in addition to which there will be the usual general discussion, open to all who attend.

As heretofore announced, our clinics will be devoted to the introduction of entirely new methods, inventions, appliances, instruments, or medicaments. We have already arranged for several, which alone will repay those who attend, and are in correspondence about others, which will probably be secured. Any desiring a place in our clinics should write immediately to Dr. F. A. Roy, No. 148 West Seventieth Street, New York.

The Academy of Medicine is convenient to several fine hotels, where rooms may be secured at one dollar per day. Gentlemen who decide to attend may obtain all information, as to hotels, railroads, etc., and receive special programme of meeting, as soon as ready, by addressing the chairman of the committee.

The profession will kindly accept this as an official invitation to our meeting, and not wait for a special one.

M. L. RHEIN, M.D., D.D.S.

GEORGE H. WINKLER, D.D.S.

RODRIGUES OTTOLENGUI, M.D.S., *Chairman*,
115 Madison Avenue.

CORROSIVE SUBLIMATE AS A DISINFECTANT AGAINST THE STAPHYLOCOCCUS PYOGENES AUREUS.—A. C. Abbott (*Johns Hopkins Hospital Bulletin*, No. 12, April, 1891) publishes the results of tests made upon cultures of the staphylococcus pyogenes aureus with a 1 : 1000 solution of corrosive sublimate. Abbott finds that the disinfectant power of corrosive sublimate in the above concentration, when tested by methods which exclude the carrying over of minute quantities of the disinfectant, is not so great as has been claimed. He holds that in many of the experiments heretofore made to test corrosive sublimate the latter has been assigned a higher rank than it deserves, because some of it has been transferred to the culture medium, and has inhibited, but not destroyed, the growth.

His experiments were made upon liquid cultures containing sterilized sand. With cultures of this sort he was able, by filtration, to get a better distribution of the organisms in the liquid, avoiding macroscopic clumps, which might interfere with the action of the disinfectant upon the organisms in the centre. Suspensions in water were also used, also filtered. Fresh cultures and fresh solutions of corrosive sublimate were used, of course, in every case.

Abbott finds that the number of organisms makes a difference in the efficacy of the disinfectant. The greater the number of organisms the more difficult the disinfection. Cultures vary in their resisting power,—organisms from one culture resisting better than those from another. Cultures in beef-tea resist better than suspensions in water. Organisms which remain alive after the action of the disinfectant are retarded in their growth and are weakened in virulence. Corrosive sublimate, in the proportion of 1 : 400,000, retarded growth in cultures of bouillon containing peptone; 1 : 600,000 without peptone. The staphylococci, which have been attenuated by the action of the sublimate, regain their virulence when cultivated for some time on ordinary culture media.

—B. MEADE BOLTON, M.D., Haagland Laboratory, Brooklyn.

TURPENTINE AS A GERMICIDE AND ANTISEPTIC.—Although the oil of turpentine (*oleum terebinthinæ*, U.S.P.) is not unknown as an antiseptic and germicide, its insolubility in water and irritating properties have hitherto made its use impracticable. That it has its special uses, however, in this connection, I have had abundant testimony.

It is a well-known fact among naturalists that, if the air of a cabinet be impregnated with the vapor of turpentine, the specimens are safe from the ravages of moths and like intruders so long as this condition of the air of the cabinet remains.

Having learned the advantage of turpentine in preserving entomological specimens, I concluded to try its germicidal properties in cases containing surgical instruments. A bacteriological examination made four weeks afterwards, and compared with the examination of cases not provided with turpentine, convinced me of its efficacy, and I soon afterwards applied the same principle to drawers containing towels, gauze, bandages, etc.

The method is simple. The turpentine is placed in flat, large-mouthed bottles at the bottom of each case or drawer, the volatility of the turpentine causing the vapor to impregnate the surrounding air.

Of late I have also placed my surgical instruments, the night preceding an operation, in a flat dish containing oil of turpentine. The instruments are completely sterilized, are not injured by the submersion, and are easily dried by a piece of sterilized gauze or towel. The characteristic odor of turpentine can be removed by ether.

The cheapness of turpentine, and the ease with which it may always be obtained, added to its special adaptability in preserving the aseptic condition of instruments, bandages, etc., by its vapor, may make it a valuable addition to the list of antiseptics and germicides.

I have also used benzol in the above manner. Its greater volatility gives it a more rapid germicidal action than turpentine, but its great inflammability admonishes caution in its use.—W. SCHLEPPGREGG, A.M., M.D., New Orleans, in *Medical News*, May 30, 1891.

MICROCIDIN—A NEW ANTISEPTIC.—M. Polaillon (*Journal de Médecine de Paris*) presented to the Académie, in the name of Dr. Berlioz, professor at the medical school of Grenoble, an experimental and clinical study of microcidin. He thinks that antiseptic thera-

peusis is not more generally employed by the public because of the inconvenience of the antiseptics now in use, such as the mercuric salts, phenol, naphthol, thymol, salicylic acid, boric acid, etc., which are dangerous on account of their toxicity or caustic properties, or of disagreeable odor, or uncertain or inconvenient to handle because of their insufficient solubility in water. The remedy in question possesses a very feeble toxicity, is caustic, and is very soluble in water, at the same time being without odor or taste. It is a combination of naphthol and soda. One part of microcidin is soluble in three parts of water. In medicinal doses, even the largest required, it is not caustic; it is unirritating when applied to wounds, is odorless, and may be used for toilet purposes. It does not corrode instruments or dressing materials. It reduces fever rapidly, and is excreted by the urine, which is rendered aseptic. It has been employed successfully in a large number of cases of infected and operative wounds. It is used in aqueous solution in the strength of 5 to 1000 (strong solution) and 3 to 1000.—*L'Organe de la Confraternité Médicale*, July, 1891, p. 163.

XYOKTANIN is a failure as an antiseptic, says Dr. Roswell Park (*Annals of Surgery*). It cannot be relied upon in surgery except in strength that is dangerous. As an injection in gonorrhœa, he adds: "I have had no experience with it, but find that most of those who have tried it have met with disappointment. Upon granulating surfaces it does not appear to be stimulating and to exert a desirable effect, but no more so than other substances within easy or easier reach, and its stain is often undesirable. In ophthalmological practice it appears also to have scarcely come up to the requirements of the day. On the whole, then, it has but few qualities by which we are to commend it above numerous other drugs of its general class, while in all that may answer to the more scrupulous demands of aseptic surgery it has proved in my hands—as in those of others who have tested it from the purely clinical standpoint—disappointing."—*Medical Record*.

DERMATOL.—By this name Dr. R. Heintz, of Breslau, designates a new chemical preparation, the basic gallate of bismuth, which he recommends as an antiseptic with varied therapeutic uses, that may

be used advantageously in the place of iodoform. Dermatol is a fine, absolutely inodorous powder, of saffron-yellow color, non-hygroscopic, and unaffected by light and air. As it is insoluble in ordinary vehicles, it can only be employed in powder. Besides its strong antiseptic properties, it has a stimulating and astringent action which makes it valuable in the treatment of wounds and ulcers, in that it hastens cicatrization. On account of its insolubility, poisoning by it is impossible; it does not produce even a local irritation. According to Dr. Heintz, dermatol may be substituted for iodoform in all cases where the latter is indicated. It may also be used internally, in daily doses of two grammes (thirty grains), in diseases of the digestive tract, especially in the profuse diarrhœa which is present in catarrhal and ulcerous affections of the intestines.—*Revue Médico-Pharmaceutique*, June 30, 1891, p. 111.

LOCAL ANÆSTHETIC FOR COMPARATIVELY PAINLESS EXTRACTION OF TEETH.—As one of the great corps of "country doctors" who act in almost every capacity for their patrons, I submit the following formula as a local anæsthetic for the almost painless extraction of teeth:

R Hydrochlorate cocaine, 5 parts;
Crystal. carbolic acid, 6 parts;
Pine gum camphor, 6 parts;
Ninety-five per cent. alcohol, q.s. to make 120 parts. M.

Inject one to three minims of this mixture, with a hypodermic syringe, deeply into the gum on the inner and outer sides of the tooth. Apply over the gum a piece of absorbent cotton wet in the solution. Wait four to five minutes. The gum can then be freely incised and the tooth drawn with a minimum amount of pain. Try it.

J. WILTON HOPE, M.D.

POQUOSIN, YORK CO., VA.

—*Virginia Medical Monthly*.

DR. J. E. SHOEMAKER (*Journal of the American Medical Association*) gives some vigorous thrusts at those who oppose antiseptic methods. We append abstracts:

"When is Antisepsis a Failure?—Outside of a comparatively small circle of surgeons there are heard from time to time sugges-

tions, which occasionally appear in print, that the system of 'Listerism,' so-called, is a failure. Strange as it may seem, it is not very uncommon to hear some one say that in a given case 'every antiseptic precaution' was adopted, but the result was bad. The speaker would have you believe that he had done his part and that the system was at fault.

"Now, it is worth while to consider briefly where the difficulty lies; and without entering the discussion of asepsis as opposed to antiseptis,—absence of dirt *versus* sterilization of dirt,—without advocating special methods or dressings, attention may be drawn to practical difficulties which lead to misunderstanding.

"A few men, like Mr. Tait, vigorously attack the theory of Listerism, while they themselves carry out the principles underlying its success. The reputation of Mr. Tait, however, rests upon his operative work, and not upon his opinions or his explanations. When, in characteristic style, he says (*British Medical Journal*, September 27, 1890, p. 287), . . . 'The tone and attitude adopted by Sir Joseph Lister, at Berlin, clearly show that the whole sad business is on its last legs,' etc.; also (p. 729): 'I venture to say that before the present generation has run out the word "antiseptic" will be all that is left to represent this strange structure,' the harm that he can do is not great among the men who are doing the best work in surgery, especially in general surgery. These cannot work for a day without discovering for themselves that their results are better or worse, according to their greater or less microscopic and chemical cleanliness in operating. Active surgeons do not care how Mr. Tait explains his good results. He might refuse to believe in the law of gravitation if he choose, but as long as he did not violate it, as long as he refrained from walking out of windows and off precipices, his opinion as to the law would make little difference. Most men care little that he denies the evil potency of germs and relies upon removing decomposable material from his wounds. They remember that he deals with a peculiar membrane and its neighborhood, that he is extremely clean in his work, and they will permit him to attack Sir Joseph Lister personally, and his impregnable principles to his heart's content,—principles of the widest practical application. The harm Mr. Tait can do is to unsettle the mind of the man who is beginning his work; and, worse than that, his writings tend to salve the conscience of those who have had no training in genuine aseptic methods, who fail consequently to fully carry them out, and who joyfully hail any champion who even seems to justify their indifference.

"But even among the better-trained class of men does not one often see a lamentable failure to grasp the essential ideas of surgical cleanliness?"

"There are hundreds of men to-day who apparently persuade themselves that mopping a 1 to 20 carbolic acid, or a 1 to 2000 bichloride of mercury solution about a wound area constitutes using 'every antiseptic precaution,' as the phrase goes. There are also men who will use chemicals upon a septic patient, but neglect to change infected bedding. There are men who will go to an operation with the points of their scissors, the locks and serrations of their hæmostatic forceps, the eyes of their needles, choked with dried blood or worse material from the last operation. They never boil an instrument. Their conscience is satisfied with the carbolic acid in the instrument pan. Some men wash their hands before an operation no better than before dinner. When an instrument or a sponge drops to the floor they may rapidly rinse it in the pan and use it at once. There are other men who have trained nurses, sterilized dressings, and boiled instruments, but who, after they have washed for the operation, shake hands with a spectator, put a hand in a pocket, remove instruments from an old blood-stained case, help carry a table, handle dusty bottles, or use a handkerchief, and yet say they use every antiseptic precaution. Many men know better. What is lacking is careful self-training and what may be called an aseptic conscience. What is wanted is a realizing sense of the real difficulty in getting things clean and then keeping them so. Carbolic acid solutions as practical sterilizers are a delusion and a snare. They work slowly at best. Unless too strong for comfortable or safe handling they do little good, and they do enormous harm by quieting the conscience of the man who ought to spend more time in cleansing his hands; yet how many times do we see them relied upon when they only cover dirt. Antisepsis is a failure when it is superficial. . . .

"There is no doubt that the great principle of cleanliness in surgery, whether obtained by soap, hot water, dry heat, or chemicals, has come to stay, and the sooner all of us act thoroughly upon that principle, ignoring personal discussion, the better."

INDEX TO VOLUME XII.

ORIGINAL COMMUNICATIONS.

	PAGE
The Influence of Adenoid Hypertrophy at the Vault of the Pharynx upon the Development of the Hard Palate. By Dr. D. Bryson Delavan, New York	1
Concerning Third Molars. By Dr. C. A. Brackett, Newport, R. I. . . .	10
Professional Ethics. By Dr. S. B. Bartholomew, Springfield, Massachusetts	17
The Relation of Dental Societies to the Profession. By Jos. King Knight, D.D.S., Boston, Massachusetts	23
A Case of Necrosis of the Superior Maxillary Bone. By B. D. Friedewald, D.D.S.	29
Inter-Dental Splints. By Alonzo P. Beale, D.D.S., Philadelphia	81
Erosion. By William H. Trueman, D.D.S., Philadelphia	86
Why has the American Dentist a High Reputation throughout the Civilized World? By Dr. C. T. Terry, Milan, Italy	97
Independent Dental Journalism. By L. Ashley Faught, D.D.S., Philadelphia	100
A Case in Practice. By J. G. W. Werner, D.M.D.	105
Some Conditions of Mutual Interest to the Dentist and the Oculist. By George T. Stevens, M.D., New York	145
The Obtunding of Sensitive Dentine. By George F. Eames, M.D., D.D.S.	158
The Function of the Odontoblast. By J. E. Stanton, M.D., D.M.D., Boston, Massachusetts	163
Anæsthetics in Dental Practice. By J. Cowan Woodburn, M.D., Lecturer in Glasgow Dental Hospital	165
Creolin. By Dr. Wm. H. Potter	209
The Retention or Removal of the Sixth-Year Molar,—Which? By Theodore F. Chupein, Philadelphia	213
Some Ancient Theories. By H. H. Schumann, D.D.S., Chicago	218
The Formation of Enamel. By R. R. Andrews, D.D.S.	273
Plastic Materials in the Preparatory Treatment of Teeth. By Jacob L. Williams, M.D.	281
Work. By Professor J. S. Wight, M.D.	284
Office Notes. By Dr. William H. Rollins	292

	PAGE
Removal of the Pulp by the Use of Cocaine. By Edward C. Briggs, M.D., D.M.D.	296
Structure of Protoplasm. By Carl Heitzmann	341
The Physiology and Pathology of the Second Dentition. By Richard Cole Newton, M.D., Montclair, New Jersey	353
Aneurismal Tumor of the Right Alveolar Process and Vault of the Mouth treated by Injection. By John S. Marshall, M.D., Chicago, Illi- nois	367
Prophylaxis in the Field of the Dental Surgeon. By Charles B. Atkinson, D.D.S., New York	371
Treatment of Proximate Surfaces. By W. H. Dwinelle, M.D., D.D.S. .	376
The Organization and Diseases of the Teeth. By E. G. Tucker, M.D. .	379
Dental Education. By Henry Leffmann, M.D., D.D.S.	383
Immediate Root-Filling. By J. A. Libbey, D.D.S., Pittsburg, Pennsyl- vania	388
Anæsthetic Operation for the Treatment of Diseases of the Antral Cham- ber. By J. N. Farrar, M.D., D.D.S., New York City	421
Proper Care of the Eye-Sight. Lewis S. Dixon, M.D.	423
A Cursory Glance at Tetanus. By G. Lenox Curtis, M.D., D.D.S. . .	438
A Method of Correcting Irregularities. By J. Lehman Eisenbrey, D.D.S.	444
The Extraction of the First Permanent Molar. By Dr. Eugene J. Wetzel, Mulhouse, Germany	446
The Relation between Dental Caries and Diet. By L. Ashley Faught, D.D.S., Philadelphia	448
Secret Preparations. By Dr. S. B. Palmer, Syracuse, New York . . .	451
Local Anæsthesia and the Dentist. By Dwight M. Clapp, D.M.D., Boston, Massachusetts	452
An Improvement in Flask Presses used within the Vulcanizer. By Wil- liam H. Trueman, D.D.S., Philadelphia	454
The Injurious Effects of Vegetable and Mineral Acids upon the Enamel of the Human Teeth, with some Curious Illustrations. By George W. Weld, M.D., D.D.S.	501
Address by Eugene S. Talbot, M.D., D.D.S.	510
The Teeth of Invertebrate Animals. By Alton H. Thompson, D.D.S., Topeka, Kansas	519
The Genesis of the Contour Filling. By George S. Allan, D.D.S., New York City	525
A Discussion of the Fee Problem. By William Barker, D.D.S. . . .	533
Dental Organizations. By Walter Harrison, D.D.S., D.M.D., Brighton, England	541
The Bacteria of the Air as a Disturbing Factor in Dental and Surgical Operations. By W. D. Miller, M.D., D.D.S., Berlin, Germany . .	581
Growth of the Cementum. By R. R. Andrews, D.D.S., Cambridge Mas- sachusetts	587
Dental Infirmary Patients. The Use and Abuse of Dental Charity. By Richard Grady, M.D., D.D.S., Baltimore, Maryland	592
Dental Responsibility for Early Diagnosis of Tumors of the Mouth and Jaws. By Arthur K. Stone, A.M., M.D.	602

A Comparison of the Methods and Surroundings of English and American Dentists. By Waldo E. Boardman, D.M.D., Boston, Massachusetts	609
Observations on Dental Caries. By Dr. A. M. Ross, Springfield, Massachusetts	612
Tincture of Chloride of Iron. By Thomas J. Giblin, D.M.D.	614
The Relations and Resources of our Specialty. By Horatio C. Meriam, D.M.D., Salem, Massachusetts	617
What Value has Argenti Nitras as a Therapeutic Agent in Dentistry? By Dr. E. A. Stebbins, Shelburne Falls, Massachusetts	661
Pathological Conditions produced by Galvanic Action between Dissimilar Metals in the Treatment of Caries of the Teeth. By George W. Whitefield, M.D., D.D.S., Evanston, Illinois	671
Vitality as a Germicide. By Thomas Fillebrown, M.D., D.M.D., Boston, Massachusetts	678
The Rheumatic and Gouty Diathesis as Manifested in Diseases of the Peridental Membrane. By John S. Marshall, M.D.	690
A Few Words in Regard to the Sterilization of Instruments. By Harold C. Ernst, M.D.	741
Histological Methods and Results. By L. C. Ingersoll, Keokuk, Iowa	748
Alveolotomy. By G. S. Junkerman, M.D., D.D.S., Cincinnati, Ohio	760
A New Method of Running the Suspension Dental Engine by the Electric Current. By T. A. Fletcher, D.D.S., New York	762
The Chemical Metamorphosis of the Fluids of the Mouth with Relation to Discoloration of Gold. By Edward S. Niles, D.M.D.	805
How shall we practise Dentistry in order to make it Healthful? By Dr. Charles T. Terry, Milan, Italy	809
Abrasions of the Teeth. By Dr. A. F. Townsend, Worcester, Massachusetts	811
Rapid Operations. By Frank Perrin, D.M.D.	815

REPORTS OF SOCIETY MEETINGS.

American Dental Association.—Thirtieth Annual Meeting, Excelsior Springs, Missouri, August, 1890	31, 109, 172
New York Odontological Society	41, 223, 300, 392, 456, 544, 694
American Academy of Dental Science, 55, 182, 236, 319, 399, 466, 558, 631, 728	
Harvard Odontological Society	191, 323, 479, 640, 779
Union Dental Meeting, held in Boston, Massachusetts, October, 1890	63
New Jersey State Dental Society.—Twentieth Annual Session,	117, 177, 240, 401, 470
Pennsylvania State Dental Society	125, 406, 475
Swiss Odontological Society	127
The James Truman Dental Society of the University of Pennsylvania	256
American Medical Association	569, 627, 707
Odontological Society of Pennsylvania	307, 786
National Association of Dental Faculties	469
National Association of Dental Examiners	652
American Dental Association, Saratoga Springs, New York, August, 1891,	717, 764, 818

EDITORIALS.

	PAGE
American Dental Degrees in England	66
Koch's Treatment of Tuberculosis	68
The Tariff on Manufactured Teeth	130
Dr. (?) Hunter's Dental Anodyne	131
To Contributors	132
Have we a Code of Ethics?	198
Independent Dental Journalism and its Use	199
Annual Meeting of the Dental Protective Association	201
Professional Plagiarism	259
American Dental Association	261, 656
Contour Fillings: Their Place in Dental History	332
William H. Atkinson, M.D., D.D.S.	334
The Conventions	408
The United States Supreme Court Decision in "Tooth-Crowns"	410
Dr. James W. White	411
Dr. Edward Maynard	411
Arsenious Acid in Dentistry	485
James W. White, A.M., M.D., D.D.S.	488
Saratoga Springs, New York	489
Southern Dental Association	489
Editor of the <i>Dental Cosmos</i>	489
Original Ideas—Inlays	575
Joint Union Meeting of the New Jersey and Pennsylvania State Dental Societies	578
The National Association of Dental Faculties and the National Association of Dental Examiners	657
Criticism of Dental Colleges	731
Nitrate of Silver.—Stebbins	734
To the <i>Dental Review</i>	734
Deposit Plates	735
The Dental Protective Association	798
The <i>Dental Advertiser</i> and its New Editor	800
Where should Papers be published?	847
The Closing of the Year	850
Assistant Editor	851

BIBLIOGRAPHY.

BIBLIOGRAPHY	69, 132, 201, 261, 335, 489, 735, 800, 852
------------------------	--

OBITUARY.

William W. Fouché, D.D.S.	77
Daniel Frank Whitten, D.M.D.	336
William H. Atkinson, M.D., D.D.S.	336, 417
Dr. Ambler Tees, Sr.	336
Dr. Edward Maynard	413

	PAGE
Professor Joseph Leidy	416
James W. White, A.M., M.D., D.D.S.	490
Chicago Dental Society—Resolutions on the Death of Drs. William H. Atkinson and James W. White	492
Resolution of the Central Dental Association of Northern New Jersey on the Death of Dr. Atkinson	493
St. Louis Dental Society—Resolutions on the Death of Dr. Atkinson	494
Dr. Ralph A. Parsons	494
Resolutions on the Death of Dr. James W. White	578
American Academy of Dental Science—Resolutions of Respect	579
C. E. Hawley, D.D.S.	579
Dr. Frank Whitten, D.M.D.,—Resolutions of Respect	659
Resolutions of Respect to the Late Dr. William H. Atkinson, of New York	660
C. A. Kingsbury, M.D., D.D.S.	801
Dr. David Roberts	803
American Dental Association—In Memoriam: Dr. W. H. Atkinson	855

DOMESTIC CORRESPONDENCE.

DOMESTIC CORRESPONDENCE 138, 205, 412, 660, 737, 857

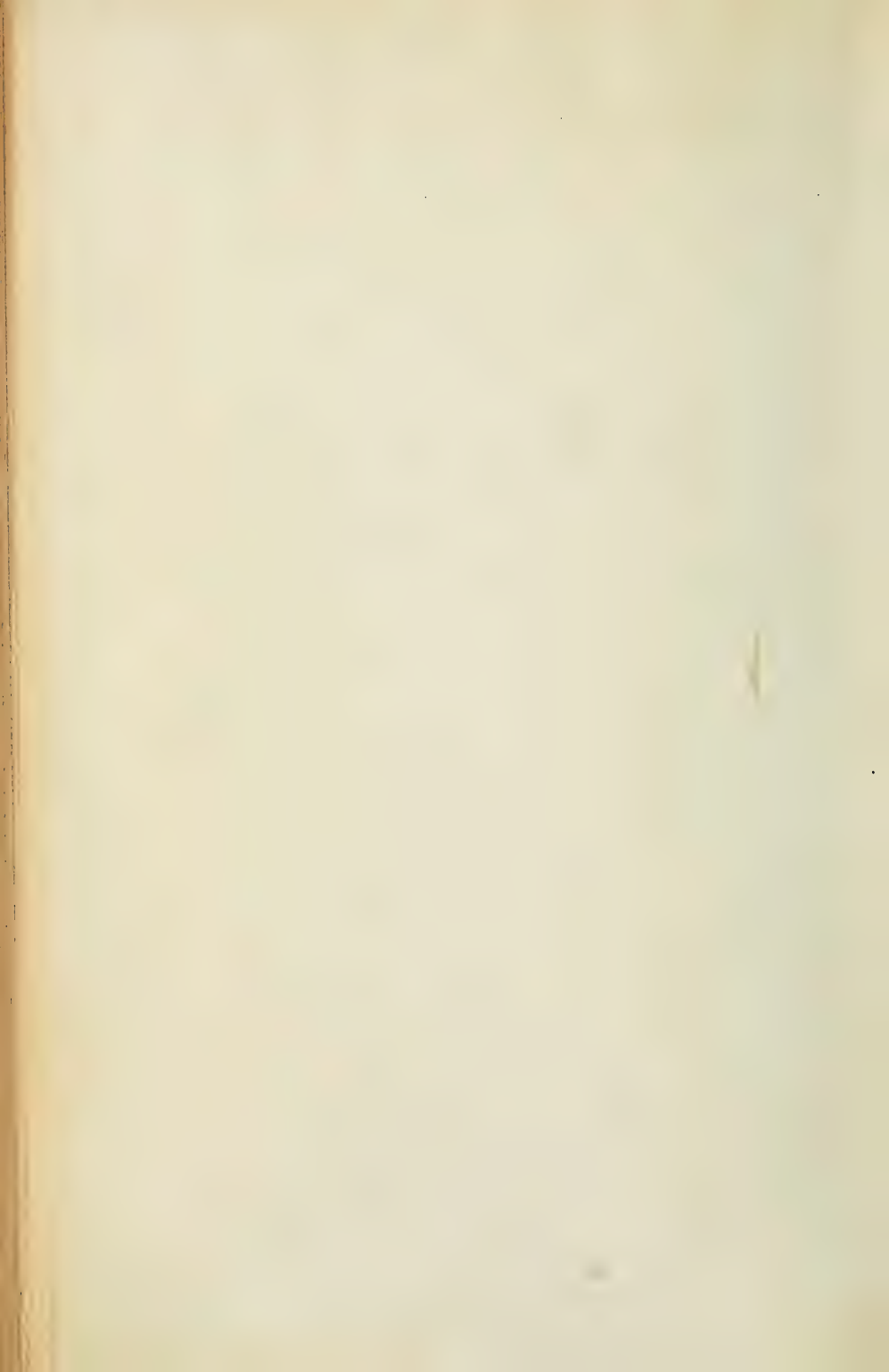
FOREIGN CORRESPONDENCE.

FOREIGN CORRESPONDENCE 204

CURRENT NEWS.

CURRENT NEWS 78, 142, 205, 263, 338, 419, 495, 580, 739, 804, 861





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